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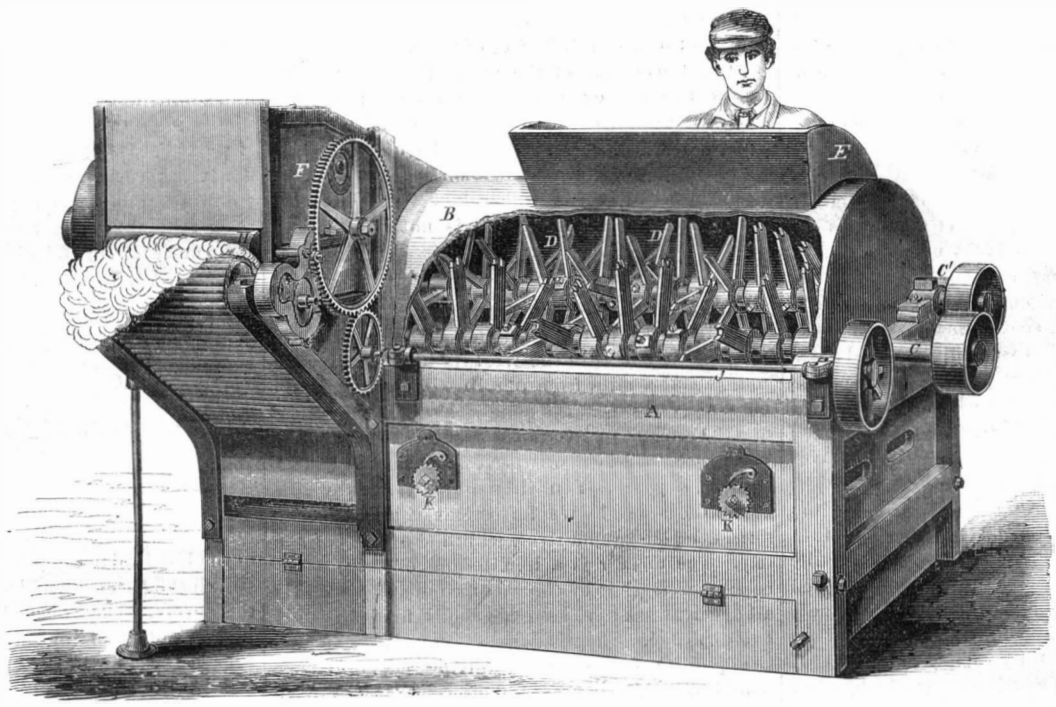
Improved Cotton-opener and Cleaner.

The accompanying engraving is a representation of a new and improved cotton-opener and cleaner, which has been recently introduced in various parts of the country. There are no feed rollers to it, and the general arrangement of the several parts will be fully understood by referring to the subjoined description and illustration. All parts of the machine are not visible in the position it stood at the time it was photographed, but the explanation will supply what is lacking.



VAN WINKLE'S PATENT WILLOWER.

The oblong casing, A, is covered with a hood, B, and constructed with suitable bearings for the two horizontal shafts, C C′, which run lengthwise through it. The shafts are parallel with each other, and have beaters, D, secured upon them spirally about their axis in such relations to each other that, those upon the shaft, C, revolve between the spaces of those on the shaft, C′; the shafts themselves revolving in opposite directions. The grating under the shafts (not seen in the engraving) is accommodated to the circle described by the ends of the beaters. On the top of the machine is a hopper, E, in which the cotton to be fed is placed, and near the other end of the hood there is a box containing a rotating screen, F, placed on one side of the machine, which has a free communication with the box, A; the shaft of the screen is parallel with the beater shafts. The beaters are arranged along the whole length of the shaft, as may be seen through the hood, a portion of which is broken away to show the interior. An endless apron, G, is provided, which runs on two rollers arranged parallel with the beater shafts, and extending from the end of the grating within the box, A, to the box, F, and out through an opening in the back of the same; this apron works close under the rotating screen. The roller, H, is capable of being revolved by the endless apron, or by the friction of the cotton upon it. In the end of the box next to the hopper, there are openings, I, above the grating, and also one below for the admission of air; the latter is fitted with a slide to regulate the force of the draft. The driving shaft, C, transmits motion to the screen through the medium of a shaft, J, arranged at the back of the box, A, which shaft is driven by a belt or gearing, as desired, and so connected with the rotating screen that it revolves very slowly. The apron is driven by suitable gearing, and the fan runs at a high velocity, through a belt, from a pulley on shafts, C and C′. There are also two shafts, K, fitted with pawls and ratchet wheels below the grating, D, which carry two cams, quickly operated by wrenches, for the purpose of raising or lowering the grating as may be required, according to the length or condition of the fiber to be cleaned. These are the principal details. Respecting the operation of them the inventor says:—

The cotton is fed in at the end opposite the blower where it undergoes a semi-scutching operation; this is afterwards repeated by the second cylinder returning it again to the first—the cotton being drawn along lineally through the shafts by the draft of the blower. The lighter portions of the fiber are drawn through quickly with very little working, while the heavy or more compact portions remain in the machine until they become as light also, they having received much more beating in consequence of their remaining longer in contact with the revolving beaters, while dust and all fine particles of foreign matter are most effectually separated and blown away.

It will be seen that the cotton receives no violent tearing operation, as is the case in most willows when it is held by feed-rollers, and chopped off and thrown out at a single blow, but is acted on as if a piece was loosely beaten about by the hand operation until it is perfectly softened and cleaned. All rolling is prevented by placing the draft apertures below the grate; the air passing up through keeps the cotton suspended among the beaters in a lively manner.

In offering this machine to cotton manufacturers the patentee would say that manufacturers in and about Paterson have already adopted them, also others in Pennsylvania, Massachusetts, Rhode Island, and Connecticut; some are running in each of those States, and orders have been received for more. The first machine that was made, as an experiment, was sold to a manufacturer in Connecticut. All of those persons who have used them give the highest testimonials in their favor over their own signatures, while not the first word of fault has ever been found with them. To the operatives in factories they are a great benefit, by ridding the picking room instantly of the dust which is so oppressive and detrimental to their health. One machine is able to run through about four thousand pounds of cotton per day, of any quality suitable for twist, or by setting it close and feeding slower it will clean and open from ten to fifteen cwt. of the worst refuse—hard, moldy cakes, or any other damaged or dirty stuff.

The price of this improved willower is $250. It is manufactured exclusively at the Machine Works of J. E. Van Winkle & Co., of Paterson, N. J. The patent for this invention was procured through the Scientific American Patent Agency, on June 2, 1863, by J. E. Van Winkle, of Paterson, N. J., of whom further information can be obtained.

THE ELECTRIC LIGHT FOR LIGHTHOUSES.—A parliamentary paper, recently issued, contains further reports of Professor Faraday on the employment of the Electric Light at Dungeness, on the English coast. It has been on trial for nine months: failed only once, for two minutes, another time for thirty seconds, and, on a few other occasions, for shorter intervals. Professor Faraday estimates the light to be eight times as intense as that of the Grisnel lighthouse, which is one of the most brilliant in sight of Dungeness. No reliable experiments have yet been made to ascertain the superior degree of power of the electric rays in penetrating a foggy atmosphere—which is a point of great importance. Regarding the question of cost, it appears from the parliamentary return, that the expenses incurred for the establishment of the apparatus at Dungeness, amounted to £6370; and that the estimated annual charge for maintaining the electric light is £724, or $3.620 per annum. Its great cost has caused it to be rejected by those who have charge of the lighthouse system.

A CUPOLA iron-clad has lately been built for the Royal Danish navy, at Glasgow, Scotland, by Robert Napier & Sons. She is called the *Rolf Krake*, and has two revolving cupolas 4½ feet above deck and 21 feet in diameter. Her length is 185 feet; breadth, 33 feet; depth, 16½ feet, and she is 1,246 tuns burden. She is armed with 4½-inch plates from stem to stern, increasing to 7½ inches at the port hole lined with teak 9 inches in thickness. The engines are 240 nominal horse-power; the decks are 5 feet out of water, with folding bulwarks. She is intended for a good sea-going vessel, and her speed, upon trial, slightly exceeded ten knots per hour.

THE Corinth (Vt.) copper mines are being worked under the direction of a New York company. A number of English miners have already gone to work, and more are expected.

A MIXTURE in equal proportions of flour and salt will have the desired effect in stopping bleeding grape vines, when grafting wax and burning have failed.

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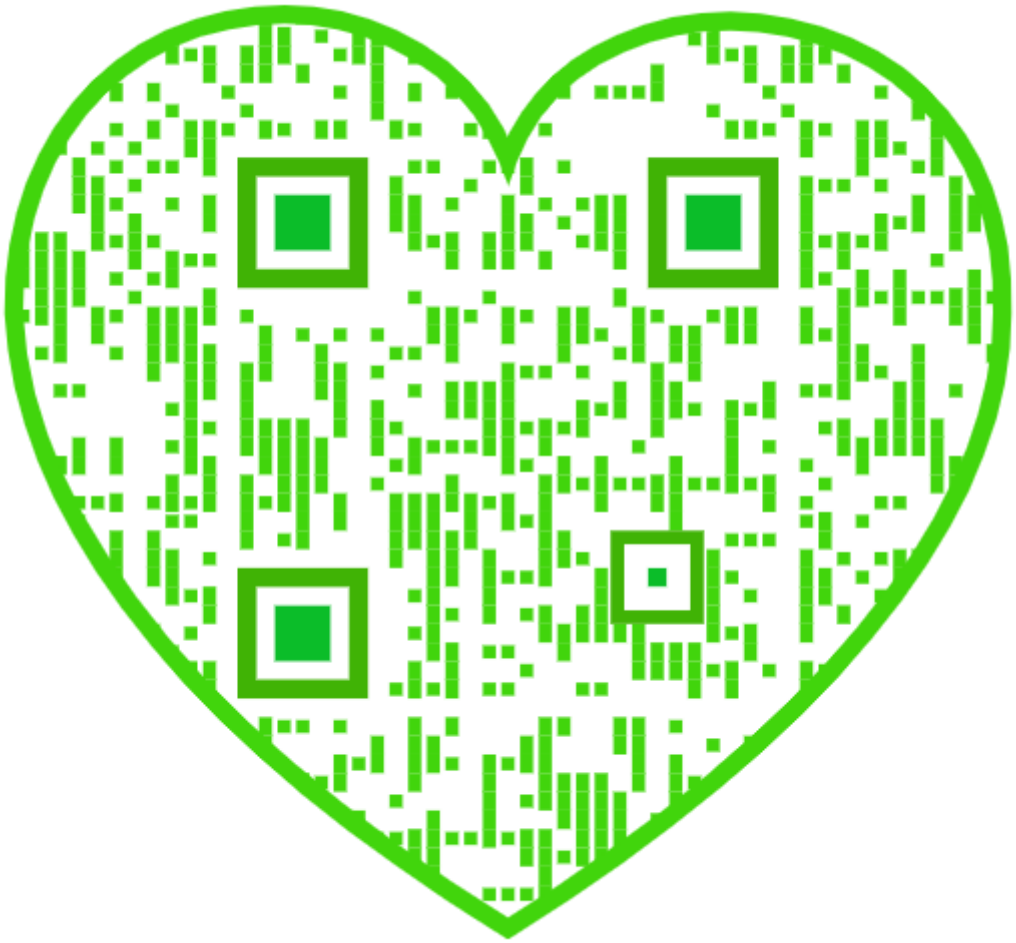

Testing Gilded and Silver Articles.

The following methods are employed in the German revenue-offices for testing the value of articles that are gilded and silvered, as described in the *Zeitschr. Deutsch. Ingenieure*:—

Testing of Gold.—The ordinary method of testing gold is founded upon the insolubility of this metal in nitric acid. If a mark be made on the "touchstone" with the article under examination, the gold is not dissolved by this acid, whereas golden-colored alloys of inferior value are dissolved and disappear immediately. When articles are very thinly gilded, the detection of the gold in this manner is uncertain, in which case the following method may be used with advantage. This process depends upon the fact that an aqueous solution of chloride of copper is without action on gold, whereas on golden-colored alloys, as brass, pinchbeck, &c., it produces a black spot.

A little carbonate of copper is put into a test-tube, and to this is added, drop by drop, pure hydrochloric acid till the blue powder has dissolved to a clear green fluid, occasionally warming it over a spirit lamp. This concentrated solution of chloride of copper is diluted for use with from ten to eleven times its volume of distilled water. Before testing, the metallic surface must be well cleaned. This can be done effectually, by brushing it for a minute or two with a little spirits of wine; or better, with absolute alcohol.

The surface having dried, a little of the testing fluid is dropped on, and allowed to remain in contact for about a minute. The fluid is then removed by means of a small pipette, and the surface of the metal completely dried with bibulous paper; if no dark spot be then visible, the article is coated with pure gold. If the metallic surface is but lightly gilded, a very slight blackening is sometimes remarked, which may throw a doubt upon the result. In such a case, to make quite certain, a little of the surface may be scraped off, and then the testing fluid again applied. If a dark spot is then perceived, the article may be considered as very thinly gilded.

If a further and more direct proof of the presence of gold is required, the article to be examined, or a piece of it, may be put into a porcelain cup, and as much pure nitric acid poured over as will half cover it. The thin layer of gold covering the surface does not prevent the metal from being attacked by the acid, and the gold becoming separated, floats in thin films on the top of the liquid. The green metallic solution is now removed, and more nitric acid poured over the gold spangles: it is then somewhat warmed, and water finally added. The gold has now been fully tested by its insolubility in nitric acid, and it only remains to ascertain that it dissolves to a yellow solution in warm aqua regia.

Thin gilding of this description is often met with in the French mock jewelry; the coating is sometimes so thin that it not only deceives the eye, but it is difficult to test by the ordinary methods. Instead of putting the entire article into the acid, and thus risking its demolition, a portion of the surface may be scraped off with a knife, and tested with the nitric acid. When an article appears to be made of massive gold, the testing by means of the "touchstone" should be first resorted to.

Testing of Silver.—The ordinary and very accurate method of testing of silver is founded upon the insolubility of chloride of silver in dilute acids and in water. This otherwise satisfactory test is, however, difficult to carry out when an article is very thinly plated with silver; but in all these cases a simple and very accurate test can be used, which is based upon the reaction of chromic acid upon metallic silver. For this purpose testing fluid is prepared by adding pure nitric acid to powdered red chromate of potash, and mixing them in such a manner that a part of the latter remains in suspension, the whole being kept well stirred during the mixing. Equal parts by weight of each may be taken. The nitric must be quite free from hydrochloric acid, and have the proper degree of concentration, being neither too fuming nor too dilute; it should have a specific gravity between 1.20 and 1.25. When the mixture has been prepared for a few hours, and then stirred several times, the reddish-colored liquid is poured off from the residue and kept in a stoppered bottle. A drop of this liquid is then brought in contact with the metal to be tested, and immediately washed off again with water. If a visible blood-red spot remains, silver is present.

This method requires only the following precautions:—Firstly, the metallic surface must have been quite cleansed from grease, &c., with spirits of wine; secondly, water must be poured over the treated surface before judging of the color, as that of the testing fluid is altered by the metal, and the red precipitate is not distinctly visible until the colored liquid has been washed off. The red spot can afterward be very easily removed with the finger.

By this method the slightest trace of silver in an alloy may be ascertained. When an article is suspected to be only thinly plated, a very minute drop of the testing fluid should be used. With no other metal or alloy does this red spot, so characteristic of silver, appear. In some cases the testing fluid only corrodes the surface of the metal, while in others colored precipitates are formed; which, however, cannot be confounded with those of silver. German silver, brought into contact with the testing fluid, affords no red spot after being washed. The spot will, however, have been strongly corroded.

Britannia metal yields a black spot; zinc is strongly corroded; platinum is not attacked; lead gives a yellow precipitate; tin is strongly affected by the fluid; when the brownish-colored testing fluid is washed off, a yellow precipitate is perceived, which adheres tightly to the metal; copper is strongly attacked; a tarnished surface of this metal is brightened by the action of the acid. Bismuth yields a yellow precipitate; antimony does not; by this means, therefore, these two metals, somewhat similar in many respects, can easily be distinguished. Mercury, or an amalgamated surface, yields a reddish-brown participate, which, however, is entirely washed away by the water, and is not likely to be confounded with the silver reaction.

Who makes the Bad Shells?

"A rebel 13-inch mortar, and, I believe, the only one that they have in the West, is located in a casemate, about a mile from our lines, in a frescade of trees and vines. It has done some splendid execution. Four out of five of their shells strike within a radius of three hundred feet, and ninety out of a hundred explode. You will naturally ask why ours do not do as well? We have eight of just the same size in the Mississippi river, within two miles of the city. The answer is a humiliating one. The ordnance that is made by contract for our army is nearly all deficient. I have seen ten shells fired but only two exploded. The rebels collect our shells, and get the powder out of them—giving six dollars a pound to their men for it. This is blameworthy beyond denunciation. The blame is with contractors and inspectors. We pay for good ammunition, and receive what is worthless.

"Our artillerists are as good as any in the world. I have seen a cotton bale pointed out at 1,600 yards, struck with a Hotchkiss shell; and a bush that concealed a rebel sharpshooter a thousand yards off, torn up by the roots with the same, and it was because they could calculate on two of them being alike. I don't know where they are made, but they are the only water-tight contract shells that I have seen. In most of them the lead plug is not tight, and there are sand holes in the shell. In some of them, by actual timing, a fuse cut the same length and fired at the same elevation, will explode a hundred feet further off than another of the same length and same charge from the same gun. This should not be. Under the old regular army, when ammunition was inspected, and all other things, they could fire a howitzer with such precision as to strike a summer house, or any small object, say a tent or wagon, at a thousand yards, nine times in ten. This is a thing that can and should be remedied immediately. It is enough to risk the fire of the foe, without having to fear an enemy in friends at the rear."
—*Exchange.*

The Italian frigate, *Re d'Italia*, is rapidly receiving her plating at the Novelty Iron-works. A number of streaks are already in place. The plates are 4½ inches thick, about 20 inches wide, and 10 feet long, rough computation. They are all planed on the edges, and the work is being thoroughly executed.

Incidents before Vicksburgh.

The Western papers are full of interesting occurrences constantly transpiring before Vicksburgh. A correspondent of the Louisville *Journal*, writing from the beleagured place, on June 3d, says:—

"The enemy having put some 64's in position in our front yesterday, thought it would be a fine thing to try their range to-day, so boom! er-r-r-er-r-r-pop! went a shell, loftily, over our promiscuous heads. Next came a solid, conical shot, singing whiz-z-z-z-en-done-chuck! Full three miles this traveled, and anchored in our cattle-yard, but did no damage. Another shell burst over some of our troops, but did no harm more than to frighten them; they having just arrived, and never having been shelled before. The next salute was with canister, which did us no injury. By this time our war-dogs commenced barking. The first was a 10-pound Parrott, called our 'Fist;' the second a 20-pound Parrott, called our 'Pointer and Setter;' the third class—30-pounder—the 'Lion,' whose roar is terrific, and whose effect is terrible.

"One of them first tried a shell, with such good success that the officer in charge thought it would be a fine thing to try the efficacy of a solid shot on one of the enemy's 64's. The 'Lion' took the dose—the medicine soon worked (worse than lobelia)—then, flash—chit—chit—hit—it—t—t—crash! and up goes Mr. Reb.'s 64, end over end, to trouble us no more that day.

"Cannonading soon ceased, but the eternal din of musketry kept up its warring pop—pop—pop—all along our lines. It may be good policy to shoot musket-balls at twelve-feet walls, but 'I can't see it.' If a rebel's head sticks up, why, of course, pop! but if nothing can be seen of an animated rebel, hold your fire. Bullets do not grow on bushes, any more than soldiers do on pumpkin-vines; therefore, a little moderation, and a long pull at this horn of the dilemma, I think, would accrue to our advantage."
—*Exchange.*

Slaughter in War.

The *Revue Contemporaine* publishes an article by Count de Latour, on the important part which cavalry is likely to play in future wars. The Count, among other things, says that the opinions now generally held regarding the power of fire-arms are greatly exaggerated, and shows that many more men were lost in the great battles of the "Empire," than in the last Italian campaign. At Austerlitz, the Russians lost 30 per cent, and the Austrians 44 per cent of their army. The French lost 14 per cent. At Wagram, the loss of the Austrians was 14, that of the French 13, per cent. At La Moskowa, the Russians lost 44 per cent. At Waterloo, the Allies lost 31 per cent, the French, 36 per cent. At Magenta, on the contrary, the Austrian loss was not more than 8 per cent, that of the French only 7. At Solferino the Austrians sustained a similar loss, and the Franco-Sardinians only lost one-tenth. This may be explained by the fact that a long range obliges the projectile to describe a large curve. Thus, according to M. d'Azemar, if the "column" of the Place Vendome was placed between the gun and the mark, the latter being at a distance of twenty-five hundred yards, the projectile would pass over it without touching.

It is thought that one of the large screw propellers cast for the Italian frigates, will be lost to the manufacturers. The screw is of brass, and is an enormously heavy and complicated piece of work, weighing no less than 30,000 pounds. Some defect in the mold when it was cast, caused a portion of it to give way, whereby a large quantity of metal was diverted from its proper place, thus destroying one of the large bearings. Efforts have been made to remedy this disaster, by burning on a quantity of metal to supply that lost; but so far the operation has not been successful.

Two out of the six new steam revenue-cutters ordered by Government, have been launched. They will have direct-acting oscillating engines, with cylinders of 36 inches bore and 30 inches stroke. The models are very handsome, and give promise of speed.

The wool crop for Somerset county (Maine), the present year, will not be far from 200,000 pounds. At 60 cents a pound, it will amount to $120,000.

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An Iron-clad Vessel for California.

An armor-clad vessel for the defense of San Francisco harbor, was recently constructed by Messrs. Secor, of Jersey City,—Mr. Birbeck Superintendant—in sections, which were put together at the works, then taken apart, and shipped for their ultimate destination, there to be again fitted together, completed, and equipped. This vessel, which is of the Monitor class, is called the *Camanche.* Her dimensions are as follows :—

Extreme length over armor, 300 feet; extreme length of boat proper on water line, 190 feet; length outside of stem and stem posts, 159 feet; extreme beam over armor, 46 feet; breadth of beam of boat proper (mold) 37 feet 6 inches; depth of hold amidships, from top beams to skin, 11 feet 10 inches; crown of deck amidships, 5 inches; shear of deck measured on gunwale, 12 inches; distance from stem to extreme end of armor forward, 16 feet; distance from stern-post to extreme end of boat aft, 20 feet 3 inches; distance from stern-post to extreme end of armor aft, 25 feet.

The keel is of the best quality of flange iron, $\frac{3}{4}$ of an inch thick, butted and strapped every six feet, hollowed out 4 inches deep, and 18 inches wide, forming a "water-limber." The fore-and-aft vessel straps are $\frac{3}{4}$ of an inch thick, 8 inches wide, and thoroughly fastened with four rows of $\frac{7}{8}$ inch rivets. The fore-and-aft center keelson is formed of plates 32 inches wide, $\frac{1}{2}$ inch thick, and 71$\frac{1}{2}$ inches long, well bound with angle iron. Around the outside of the vessel, and in plane with the hip portion of the hull, there is a horizontal armor shelf 46 inches amidships, diminishing by a fair line, to 62 inches wide near the ends. The side armor, which is fastened to the wooden bulwarks, is composed of five courses of plates, measuring 5 inches in thickness. The armor extends 3$\frac{1}{2}$ feet below the water line, all round the vessel; projecting 3 feet 8 inches beyond the hull.

The turret is 21 feet internal diameter, 9 feet high, and composed of 11 plates in thickness, which measure together 11 inches through. These plates are applied in twenty sections, and join vertically, breaking joints. The top of the turret is formed of wrought-iron plates, $\frac{1}{2}$ inch thick, resting on forged beams and railway bars, placed 3 inches apart inside the turret. In the center of the plating is a circular aperture six feet in diameter, over which the pilot-house of equal diameter is placed.

The engines consist of two cylinders, 40 inches in diameter, and 21 inches stroke; combined in one piece, and supported by a strong frame, cast in one piece, firmly secured to the wrought-iron keelson. The blower-engines and blowers are of greater size than those of the *Monitor;* and, instead of being placed in the engine room, are applied under the turret, for the purpose of drawing down the cold air through the turret roof, and forcing it into the boiler room and other parts of the vessel.

Two boilers are attached, on Martin's plan, of 10 feet face, 9 feet 3 inches high, and 12 feet 6 inches long, with 8 furnaces in each. The propeller is made of cast-iron, 12 feet in diameter and 15 feet pitch.

The Siege of Port Hudson.

The public suspense in reference to Vicksburg being ended by its surrender, general attention is now concentrated on the progress of the other siege at Port Hudson. Though the fall of Vicksburg ensures the fall of Port Hudson, yet the conduct of the siege by Banks is a subject of interest. That skillful commander appears to be pushing forward his work successfully in every movement. The annoyances upon his rear from the rebels do not seem to disturb or make him apprehensive. He has a splendid corps of engineers, and under their direction his works have advanced in one place to within fifty feet of the rebel breastworks. Major Bailey has thrown up a battery to confront the rebel citadel, which is armed with two 9-inch navy guns, three 24-pounders, two 30-pound Parrotts, three 20-pound Parrotts, two 8-inch howitzers, and six Napoleon guns. There are besides, three mortars, one 8-inch howitzer, and a separate battery along side. The breastworks are laid out in two straight lines, meeting almost at an angle of forty-five degrees, and cover an extent of little over four hundred feet, the whole being constructed of cotton bales, sand bags, and earth. The rebels did not attempt by firing to interfere with the construction of this fort, but when it was finished, a fierce artillery fight occurred and the rebel citadel was knocked to pieces. The diary of an officer, captured upon his person, states that the Union artillery was tearing their camps to pieces, that the men were getting sick, and food was very scarce. This is further confirmed by the great number of desertions which occured daily. The rebels had suffered very severely from the fire of our artillery, several hundred had been killed and wounded. The soldiers were very much disheartened, and were ready to yield if their leaders would consent. They all admit that the Confederacy is gone so soon as Port Hudson and Vicksburg have fallen, and the glorious intelligence from Port Hudson is, that it has passed in under the Union flag, never to go out again.

Coolness of our Soldiers under Fire.

History is full of anecdotes of the remarkable nerve and indifference displayed by soldiers of different nations when under fire. It is to be hoped that the future historian of the present war will not omit to chronicle, among other incidents, the following paragraph illustrative of the qualities referred to :—"We asked an officer if the loss of life had been great from rebel shell. 'No,' said he, 'we take them as a joke; there will be one along directly and you can see. What time is it, Ben? Just fifteen minutes since the last—time is up—here she comes—hello, old fellow!' Plash! and the shell buried itself, exploding in the ground, throwing the dirt over the tent, and some of the pieces falling within reach of us—the hole only twenty feet from the door. They laughed heartily, why, we could not tell; it was anything but amusing to us. We were about to bid them good day, when they kindly invited us to stay and see another. 'It will not be long, gentlemen, there will be another in fifteen minutes; don't hurry.' We did not see it in that light, and sped on our adventurous way. Had the ground been hard or rocky, the shell would in all probability have exploded on the surface, and then there would have been two enlighteners shot."

Government Laboratory.

A laboratory for the preparation of medicines for the army, has been established in Philadelphia. It is designed to manufacture in this laboratory all the quinine for the Government. A building in New York is used in bottling liquors and putting up prepared medicines, but not in their manufacture.

The employes, including laborers, number fifty-one. Of these, twenty-eight are girls, occupied in the sewing-room, and bottling and labelling department. As far as practicable, the male employes have been selected from discharged soldiers, and the females from those who have parents or relatives in the army on whom they are more or less dependent for support.

The establishment is an experiment of Surgeon General Hammond, the object being the production of a superior quality of drugs at less cost than the contract prices. From the laboratory there are now being furnished to the army, drugs and liquors of every sort. Fourteen sewing machines are also employed, in making sheets, pillow cases, and other articles of a like character, for the hospitals.

The Cumberland Valley.

There is no richer, better cultivated or more prosperous agricultural region in the whole North than that which has recently been overrun and plundered by the rebels. The Cumberland Valley extends from the Susquehanna to the Potomac, a distance of about eighty miles. It comprises the counties of Cumberland and Franklin, in Pennsylvania, and the county of Washington, in Maryland, containing an aggregate population of nearly one hundred thousand souls. From two and a half to three millions of bushels of wheat are annually produced in the valley, together with vast quantities of rye, oats, corn, hay, potatoes and all manner of produce. The soil is a rich limestone, not easily affected by drought, and admirably adapted for grazing, as well as grain-growing. The number of horses and cattle in the valley was very large, and the southern end has been quite stripped by the invaders.

The ancient Indian name of this valley was the Kittatinny, and the mountain range that forms its north-western boundary, from the Susquehanna to Chambersburgh, still bears that name. At the latter place this range ceases abruptly, and thence to the Potomac the valley widens and is bounded by the Tuscarora.

Manufactures in the Vermont State Prison.

The State Prison contains seventy-nine convicts, about two-thirds of whom are French and Irish, and of this number six are females. The male convicts are occupied chiefly in the manufacture of scythes. Thirty dozen are made daily; the concern being run by Goodnow & Lamson, 53 Beekman street, New York. The company furnishes all the machinery and some workmen, and pays the State thirty-five cents per day for each man. The State has about a dozen men as a police, supplied with loaded muskets. The income during the last ten years has paid the expenses, to wit, about $8,000. The Episcopal rector, the Rev. Malcolm Douglas, preaches to the convicts at 1 o'clock P. M. every Sabbath, many of them taking part in the exercises. The solitary cells, tier above tier, with their iron bedsteads, some of them decorated with crosses and pictures, the convicts with their endless industry, their dress one side grey and the other almost black, the huge style of cooking, the high walls with the bastion-like houses thereon, the neatness and good order prevailing over the whole, and the kindness and skill of the superintendent, Mr. Harlow, all combined, compose a picture infinitely less repulsive than is presented by some of our county jails.

The rifle factory located on Mill Brook, contains a steam engine, and has about 275 employes, who have been engaged for nearly two years on a contract to supply the United States Government with 50,000 rifles at $20 each. It now daily turns out about 100 rifles, and is owned and managed by Goodnow, Lamson & Gale. The stocks are made of black walnut, obtained chiefly from Pennsylvania, sometimes from Indiana.

Paris Manufactures.

It is stated that the Paris manufacturers of bronze ornaments returned from the International Exhibition with orders so numerous for the products of their skill, that, after having engaged all the unemployed artists and mechanics, they found it necessary to prolong the ordinary period of work by three hours a-day. The Exhibition has also conferred immense benefit, not only on the manufacturers of bronze articles, but likewise on the French gunmakers, who at present export immense quantities of arms. The Parisian shoe-makers allow that the English beat them in the manufacture of men's boots and shoes; indeed, there are several shops in Paris established expressly for the sale of men's boots and shoes of English manufacture. On the other hand, none can compete with the Parisians in the manufacture of ladies' boots and shoes, of which they export immense quantities to England, to Russia, and the far East; they export also a second quality to the French West Indies, Brazil, and Chili. The twenty-five thousand cabinet-makers in the Faubourg St. Antoine claim that no country can compete with them in the form or delicacy of the articles manufactured by them, the suitableness of each for its intended purpose, the excellence of the sculpture, and the care exercised in avoiding every useless ornament of great expense but of doubtful taste, with which the produce of other countries is overloaded. French artisans and French tools are employed in the most celebrated English cabinet manufactories.

BOTTLING CHERRIES.—In answer to "A Country Curate's" inquiry, I can assure him, if he try the following recipe, he cannot fail to have delicious fruit for tarts through the winter :—To every pound of fruit add six ounces of powdered lump sugar. Fill the jars with fruit; shake in the sugar over; and tie each jar down with two bladders, as there is danger of one bursting, during the boiling. Place the jars in a boiler of cold water, and after the water has boiled, let them remain three hours; take them out, and when cool, put them in a dry place, where they will keep over a year. We have tried this recipe for several years and never found it fail.—*London Field.*

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THE CHEMISTRY OF ANIMAL SUBSTANCES.

Every person possesses an interest in knowing something about the chemistry of his own body. We have condensed the following from a chapter of Professors Brande & Taylor's Chemistry, a most clear and comprehensive work, recently published by Blanchard & Lea, Philadelphia.

The human body is partly composed of mineral substances, which are called inorganic; and are chiefly found in the bones. It is mostly built up however of organic substances which are the product of growth, and dependant upon life for their development. They are very peculiar in their character, and have received the name of nitrogenous substances, and nitrogenous principles, because nitrogen is one of their principal elements. Neutral nitrogenous substances are found in the vegetable and animal kingdoms; in the former they are represented by gluten, albumen, casein or legumin; and in the latter by fibrin, albumen, casein, and gelatin. In addition to carbon, hydrogen, and oxygen, they all contain nitrogen, and the greater number contain variable quantities of sulphur and phosphorus: but animal gelatine contains neither of these two elements. These nitrogenous principles are important as articles of food to animals, and are frequently described as flesh-forming substances, in order to distinguish them from the neutral compounds of the three elements—carbon, hydrogen, and oxygen, of which starch, gum, and sugar are composed, and which according to modern theory are only heat-producing. There is no material difference in the composition of these substances, whether they are direct from the animal or the vegetable kingdom. Albumen is composed of C 54.8: H 7.1: O 21.2: N 16.9 (carbon, hydrogen, oxygen, nitrogen). Casein is composed of C 54.9: H 7.1: O 22 2: N 15.8. Gluten C 55.2: H 7.5: O 21.4: N 15 9. Fibrin C 54 6: H 6.9: O 22.8: N 15 7. There is also about one per cent of sulphur and phosphorus in the above substances. All of these when out of the living body undergo spontaneous changes when exposed to moisture in the atmosphere. In a state of transition, offensive effluvias are evolved from them, and this change is called putrefaction.

Putrefaction of Animal Constituents.—The conditions of putrefaction should be generally understood. At very low temperatures animal substances do not putrefy, and it is the same with them at elevated temperatures. An elephant was found in a good state of preservation in Siberia, among ice, where it had remained perhaps for thousands of years. In the warm dry climate of South America, cattle are killed in the open air, and in a very short period the flesh dries, and may be kept in that state for months without becoming decomposed. A condition essential to putrefaction is moisture. When flesh is carefully dried by a current of warm dry air, it resists decay, and retains its nutritive powers. The various forms of gelatin and albumen when desiccated are imperishable, but in a solution of water, or in a moist state they are the most perishable of all animal proximate principles. Air promotes putrefactive changes, but flesh may be preserved fresh in some gases, such as the deutoxide of nitrogen for months. When meat is immersed in water that has been boiled to expel all the air from it, and is then covered with a layer of sweet oil, it may be kept fresh for a long time. In warm weather therefore meat should be kept in a dry cool place. The most favorable temperature for putrefaction ranges from 70° to 100° Fah.

Preserving Meats and Vegetables.—Partially boiled or roasted meat, free from all taint, and half dressed vegetables, are introduced into a tin canister, which is then soldered up, with the exception of a small hole in the lid. The canister is then placed in a bath of boiling salt brine, which is heated a few degrees above the boiling point of water, and when it is noticed that steam issues copiously from the aperture, the canister is lifted, and the hole in the lid instantly filled with a drop of solder, thus hermetically sealing the vessel. The success of this operation is indicated by the end of the canister becoming slightly concave by the pressure of the atmosphere upon it. Meat thus preserved has kept fresh for twenty years. Pure butter melted and brushed over the surface of fresh meat preserves it from contact with the air, and it will remain unchanged for a much longer period than when exposed to the air. Vinegar containing a few drops of creosote brushed over fresh meat, will also preserve it from decomposition for several days during warm weather.

Animal substances, such as birds, &c., may be preserved for scientific purposes for years in a solution composed of 4 ounces pure salt, 2 ounces alum, 2 grains corrosive sublimate, 1 quart water. This solution is poisonous. It is useful to taxidermists, and for those who wish to prepare skins without removing the fur.

Albumen.—This term is applied to an organic principle, which is most widely diffused in the animal body. It exists as a liquid in lymph, chyle, milk, and in the blood (of which it forms 7 per cent); in the salivary, and pancreatic fluids; the humors of the eye, and in the brain. As a solid, it is a constituent of the skin, brain, nerves, glands, and cellular membrane; and is the chief component of horn, the nails, hair, feathers, wool, and silk. Albumen also occurs in the juices of various vegetables, such as the potato, carrot, turnip, cabbage, &c. It is a constituent of seeds, grasses, almonds, and most of the oily nuts. It generally abounds in the shoots of young plants. The white of eggs is composed of albumen and water, contained in a very delicate membrane. It may be separated from the cellular membrane, by agitation, in 4 parts of cold water, and when filtered it becomes very clear. When heated to 160° Fah., it coagulates, and becomes white and hard. When 100 parts of egg-albumen are evaporated in vacuo, a residue of from 10 to 15 parts solid albumen remains. The white of egg is called globulin; the yelk vitellin. The latter contains 37.1 per cent of albumen; the former 12 per cent. A yellow oil, containing a little phosphorus, gives the yelk its yellow color.

Seralbumen.—This exists in the serum of the blood. It resembles the white of the egg in all its chemical properties. When heated to 170° Fah., it coagulates, forming a white substance, like that of a hard boiled egg. The cause of its coagulation by heat is not well understood. Before coagulation, it is soluble in cold water; but heat renders it insoluble. It is a remarkable substance, changing in an egg during incubation, from a soluble to an insoluble state; afterwards to be converted into feathers, beak, claws, and cellular membrane, in the chicken. Chemistry cannot account for this metamorphosis. Lime combines with albumen, forming a plastic cement, which is employed for luting the glass retorts of chemists, as it resists the action of acid fumes.

Serum, and the white of egg, are coagulated by a large number of metallic salts, such as those of iron, copper, lead, mercury, silver, and antimony. Hence, albumen is a valuable antidote in cases of poisoning by these substances—especially to corrosive sublimate.

Under the name of globulin, albumen constitutes the transparent humors of the eye, including the crystalline lens. It is also associated with the coloring matter of the blood. The substance called ptyatin, is a modification of albumen existing in saliva. It possesses the property of transforming starch, and dextrine, into grape sugar, when heated for a short period of time to 100° Fah. Pyin is an albuminous principle, found in pus. It is a formidable poison, as also is echidnine—the poison of snakes—which is similar in its chemical constitution. Albumen is a most remarkable organic substance. No other we believe, assumes so many forms and states. In the white of the egg, and in the human eye, it is transparent as the diamond; while in the hoof and horn of the animal, and the shell of the tortoise, it becomes harder than timber. In wool it forms the fiber which makes our broadcloth, and in feathers, the soft down that clothes the neck of the swan.

Vegetable albumen is generally associated with gum, sugar, starch, or oil, in the vegetable kingdom. It may be procured by macerating the succulent shoots of young plants, such as turnips, &c., in cold water; allowing the liquid to become clear, by subsidence; then filtering. It has all the properties of a weak solution of egg-albumen.

Casein.—This term is applied to the coagulable principle of milk; and forms cheese. A similar substance is occasionally found in the blood, and in the pancreatic liquids of the ox and sheep; it also occurs in vegetables. It can be procured from skimmed milk by heating it to 150° Fah., and adding a few drops of acetic acid. It is then thoroughly washed, and digested in boiling alcohol, to deprive it of oil. Thus obtained, it is white, and opaque; resembling coagulated albumen, but less firm. It is without odor or taste; and is insoluble in water or alcohol; but soluble in solutions of the alkalies, and common salt. Its compounds with the metallic bases are insoluble in water. Hence, milk is an antidote for poisoning by the salts of copper and lead; and it has been used successfully in some cases of poisoning with arsenic. Casein called legumin, is abundant in peas, beans, and the seeds of leguminous plants, being associated with starch, albumen and oil. It may be obtained from peas, by digesting these in a mealy state in tepid water, for two hours; then allowing the starch to subside, and filtering the liquid. It does not coagulate by heat; but forms a clear viscid solution. It usually contains about 0.36 per cent of sulphur. In making cheese, the milk should be heated to disseminate the oil through the mass, prior to curdling it; as cheese is tasteless and poor in quality, when the oil of the milk is separated from it. The deep, reddish color of some cheese, is no sign of richness; this being an artificial color imparted to it by annotto.

Gluten.—This is a term applied to the opaque, white, tenacious, and slightly elastic substance obtained from wheat flour, by washing and kneading it with cold water in a bag of cotton cloth. The starch in the flour is washed out with the water, leaving the gluten in the bag. It is capable of being drawn into long fibers, and when dry it becomes horny, forming the well known maccaroni. It is insoluble in water; in a partially decomposed state it forms yeast, and it induces alcoholic fermentation in saccharine liquids. The tenacious properties of dough and the paste of flour are due to it. It is more abundant in wheat and rye than other cereals, hence the flour of these grains is best suited for making raised or leavened bread. The quantity in wheat flour ranges from 7 to 14 per cent.

PERFUMES AND PERFUMERY.

Mr. Septimus Piesse, who has contributed many very interesting articles to the columns of the Scientific American, is one of the largest manufacturers of perfumery in England, in company with Mr. Lubin. Their establishment is in Bond street, London, and is a large and beautiful architectural structure, called the "Laboratory of Flowers." It has been lately visited by Charles W. Quin, F. C. S., who has given a description of his observations in the last issue of the *Chemist and Druggist.*

He states that the science of perfumery has greatly progressed of late years. Messrs. Piesse & Lubin have extensive flower farms near Nice, in the south of France, where they grow large quantities of roses, violets, and other odoriferous flowers, which are manufactured on the spot into greases, oils, ottos, and extracts. At Mitcham, in Surrey, England, they have large lavender gardens, besides an extensive bonded warehouse at the London Docks, where they make their perfumed spirits for foreign and colonial consumption. Their flower-gardens at Nice produce violets, roses, jasmine, tuberoses, jonquils, orange-blossoms, acacia, and numberless other fragrant flowers, from which scents are extracted principally by four processes—expression, distillation, maceration, and absorption or enfleurage.

The first process is used in the case of plants whose parts contain large quantities of odoriferous essential oil, such as lemon, orange, and citron peels. These portions of the plant are put into a press, consisting of an iron vessel of immense strength, fitted with a perforated false bottom, on which is placed the material from which the oil is to be expressed. A powerful screw, connected with a piston fitting into the vessel, and worked by a lever, squeezes out the liquid portions. The oil obtained is of course largely contaminated with watery extracts, from which it is separated by decantation. Distillation is adopted when the amount of essential oil is less than in the last instance. The distillation of oil of lavender may be taken as an example. The leaves are thrown into a still either heated by steam or by the

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naked fire, and containing a large quantity of water. As the heat rises, the steam passes into the refrigerator, carrying with it the essential oil of the plant. By an ingenious contrivance, the condensed steam is made to reënter the head of the still, leaving behind it the essential oil in the refrigerator, thus allowing the same water to be used over and over again. In the stills employed by Messrs Piesse & Lubin, steam at from ten to fifteen pounds pressure is used as the source of heat, it having been found that the French method of working by the direct action of the fire is liable to give the distillate a peculiar empyreumatic or burnt odor. The third method is used for finer odors, such as the rose or violet. A certain quantity of purified beef or deer suet is mixed with purified lard, and put into a clean porcelain or metal pan. Steam heat is applied, and the flowers from which the odor is to be extracted are carefully picked and thrown into the melted fat, wherein they remain for one or two days. The fat dissolves the essential oil or other odoriferous principle contained in the flowers, and of course becomes thereby highly perfumed. The process is continued with fresh portions of flowers until the grease is of the desired strength, the different strengths being indicated by the French manufacturers in numerals. Where perfumed oil is required, fine olive oil is substituted for fat. The oils thus prepared are known as the *huile antique* of such and such a flower.

The fourth process of absorption or enfleurage is the most important of them all. This process is used for those flowers whose delicate odors would be destroyed or changed by heat, and yields all those fine toilet articles known as "French pomades and oils." The whole operation is conducted in the cold. Square frames, three inches deep, two feet wide, and three feet long, are provided with glass bottoms, upon which is spread a layer of fine grease about a quarter of an inch thick; on this the flowers are sprinkled from which the scent is to be extracted. Another frame similarly charged is placed on this, and so on until a large pile is made. The flowers are changed from time to time during the whole of the blooming season. The pomades made by enfleurage are much stronger than common pomatum, as a small piece of the size of a walnut contains sufficient essential oil to perfume a large quantity of grease. To obtain this fragrant essential oil the pomade is taken out of its case, and placed in an iron cylinder perforated with slits at the bottom. In this it is subjected to pressure by a piston, which forces the grease through the slits in the form of long ribbons. These ribbons of scented grease are then macerated in alcohol for several days, and the essential oil is thus extracted. The solution of essential oil in alcohol is used to make the various bouquets of the perfumer in which the skill of the olfactory artist is highly exerted. The injudicious mingling of odors is like the inharmonious blending of notes, or colors. Thus a mixture of the extracts of orange peel, lemon peel, and lemon-grass, gives the imitation of the simple extract of verbena. Besides the extracts obtained from the enfleurage pomades, ottose and the essential oils obtained by distillation are also used for making the variegated bouquets. On one of the floors of Messrs. Piesse & Lubin's establishment, a boy is constantly employed in making the "ribbon of Bruges," which is now largely used as a fumigatory. It consists of tape soaked first in a solution of nitre, to give it smoldering properties, and afterwards drawn through benzoin, myrrh, and other odoriferous substances. The ribbon is cut into yard lengths, and put into boxes provided with a slit in the upper cover. The ribbon is drawn out to the length of an inch or so; lighted and blown out, it smolders down to the slit in the box, gradually diffusing a pleasant odor throughout the room.

Alum in Bread.

Alum has long been employed by bakers, and it certainly has the effect of rendering available, for bread-making, many qualities of flour, which must otherwise be wasted. Dr. Odling says:—"If we mix a solution of starch with infusion of malt, in the course of a few minutes only, the starch can no longer be detected, being completely converted into dextrin and sugar; but the addition of a very small quantity of alum altogether prevents or greatly retards the transformation. The action of diastase on undissolved starch is very gradual; but here also the interference of the alum is easily recognizable. Bread made with infusion of bran or infusion of malt, is very sweet, sodden, brown-colored, and so sticky as almost to bind the jaws together during mastication. But the addition of alum to the dough causes the loaves to be white, dry, elastic, crumbly and unobjectionable both as to taste and appearance. I have found that flour which is of itself so glucogenic as to yield bread undistinguishable from that made with infusion of malt, could, by the addition of alum, be made to furnish a white, dry, eatable loaf."

Alum is also said to prevent bread from turning sour and moldy. The sourness often observed in bread of inferior quality, arises from the conversion of part of the starch into lactic acid. Now, as alum prevents the transformation of starch, it may be expected also to interfere with the production of lactic acid.

Considerable discussion has taken place as to the probable effects of the habitual use of alumed bread on the digestive functions: some medical men asserting that alum, unless taken in much larger quantity than is likely to occur in bread, is quite harmless, while others attribute to it the most injurious effects. Here, as in other cases, the truth probably lies in the middle. Many of the statements which have been put forth on this, as on other questions relating to the adulteration of food, are doubtless grossly exaggerated; nevertheless it would be unsafe to assert that the use of alumed bread is quite free from objection. Dr. Dauglish says:—"Its effect on the system is that of a topical astringent on the surface of the alimentary canal, producing constipation, and deranging the process of absorption. But its action in neutralizing the efficacy of the digestive solvents is by far the most important and unquestionable. The very purpose for which it is used by the baker, is the prevention of those early stages of solution which spoil the color and the lightness of the bread whilst it is being prepared, and which it does most effectually. But it does more than is needed; for whilst it prevents solution at a time that is not desirable, it also continues its effects when taken into the stomach; and the consequence is, that a large portion of the gluten and other valuable constituents of flour are never properly dissolved, but pass through the alimentary canal without affording any nourishment whatever.

Another objection made against the use of alum—viz., that it has the power of causing the bread to retain a larger proportion of water than it otherwise would, so that bakers who use alum defraud their customers by selling water instead of bread—does not appear to rest on satisfactory evidence. Dr. Odling examined eighteen alumed, and seven non-alumed, loaves, and found that the former contained on the average 43·68 per cent, and the latter 42·78 per cent of water, the difference being quite insignificant as compared with the difference between the individual loaves, whether alumed or not.

Anti-fouling Compositions for Iron Ships.

The difficult problem of discovering a mode by which the bottoms of iron ships shall be entirely preserved from fouling, has been but little advanced by the experiment lately completed at Devonport, England. The premium offered by the Lords of the Admiralty for producing the long-desired preventives, continues, therefore, open to competition. The iron-screw steam tender *Minx*, of 303 tuns, which has engines of 100-horse power, commanded by Mr. James Pook, does harbor service for the Channel fleet and supplies the ships with water. She received, last September, on her port side, amidships, three samples of different compositions, each 10 feet wide, and extending down to the bottom of the keel. The sample forward was that manufactured by Mr. Fidemore, the next was that supplied by Mr. Elsworth, and the third was a preparation recommended by Mr. Edwards, assistant-master shipwright in Devonport dockyard. The remainder of the port side, forward and aft, and all the starboard side, received the composition of Mr. Hay, chemist, of Portsmouth. So prepared, the *Minx* was floated on the 10th of October, 1862, since which time she has been constantly occupied on harbor duty. Ships so employed foul much more speedily than those making long voyages. After three or four months' experience, it was found that sea-weed and grass had grown considerably on the port side of the *Minx*, which made her very "unhandy with her helm." Recently she was placed high and dry in dock, and an opportunity was given for examining her bottom minutely. There is considerable difference between her draught when laden with water, provisions, &c., as a tender, and when in ballast; and as she had been mostly in one or other of these conditions during the last seven months, the load line, and the ballast or light line, are most distinctly marked all round. Between the two there is not much vegetation, but on the lower line, where the compositions of Messrs. Finemore, and Elsworth, are laid on, there is a distinct fringe of weed, two feet long. Below the fringe, in the former, light sea-grass, small barnacles, and much rust, prevail. On Elsworth's composition, there are barnacles and thick grass, but very little rust. On Hay's composition, there are some weeds, and many small barnacles, but very little rust. Before this preparation was laid on, a coat of bitumen was applied to the iron. The test applied to the *Minx*, according to the present trial, places Mr. Hay's composition first, Mr. Elsworth's second, and Mr. Finemore's third, in order of success.

Gardening in Japan.

Mr. Robert Fortune, in his book on Japan, says:—"It is of all countries the most beautiful in spring. The trees were now clothed with leaves of the freshest green, and many of the early kinds were in full blossom. On every hillside and in every cottage garden there were some objects of attraction. The double-blossomed cherry-tree and flowering peaches, were most beautiful objects, loaded as they now were with flowers as large as little roses. Camellias, forming goodly-sized trees, were common in the woods, and azaleas adorned the hillsides with flowers of many hues. Here the A obtusa, with flowers of the most dazzling red, was peculiarly at home. Cydonia japonica was seen in a wild state creeping amongst the grass, and covered with red blossoms; and several varieties of primrose were met with under trees in the shady woods. On the outskirts of Yeddo, park-like scenery, trees and gardens, and neatly-clipped hedges succeed each other. The whole country here (the village of Su-mae-yah) is covered with nursery gardens. One straight road, more than a mile in length, is lined with them. I have never seen, in any part of the world, such a large number of plants cultivated for sale. Each nursery covers three or four acres of land, is nicely kept, and contains thousands of plants, both in pots and in the open ground."

Cotton in Southern Illinois.

A correspondent of the *Prairie Farmer* states that in Southern Illinois cotton looks well. Respecting his own crop he says:—"During the dry month of May it did not grow at all, and that which was not planted till late did not come up till June. It is now growing at a rapid rate. At one time I thought of plowing mine up and planting in late potatoes, but now I would not thank a man should he offer me $100 for what I expect to raise from each acre. I am thinning out the plants, so that they should not be nearer than six inches from each other; I would not care if they were a foot apart. The common plan here is to have the plants sown as thick as 'hair on a dog;' but I take old planters from the South as my guide, and the distance they decide upon is a foot."

Coal Mine Explosion.

At a coal mine explosion near Hyde Park, Pa., the other day, eight persons were killed and three wounded. Several horses and mules were also destroyed. The cause of the accident is unknown. It occurred in the morning, soon after the men had entered the drifts to commence their usual labors. Efforts were immediately made to recover the bodies of the dead and wounded, and among those rescued were three who were apparently lifeless, but they were restored by a remedy which is said to be commonly used in such cases, viz:—their heads were immediately buried in fresh-dug earth. This is certainly a very whimsical and foolish process. Common sense would indicate that fresh air was of the first importance as a remedy in such cases.

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The Value of Practical Knowledge.

Of the uses of practical knowledge we yesterday saw an illustration. A mammoth sexagonal crystal was shown to us by its owner, Mr. Mitchell. It is nearly a foot in diameter, and about eighteen inches long. Next to a specimen in Barnum's Museum, it is the largest we have ever seen. The base of the specimen is opaque quartz rock; the other portion is as clear as crystal. It was found by the Rev. Edmund Craig Mitchell, on the farm of Dr. Johnson, near Ellicott's Mills, Md. The young divine was on a visit to Dr. Johnson. From the house a path leads to a spring that supplies the family with water. Mr. Mitchell, walking with Dr. Johnson in the path, observed "a stone" about an inch above the ground. "There's a splendid specimen," said he. "Of what?" asked the Doctor. "Why, of crystal quartz," was the reply. The Doctor said he had passed that stone every day for thirty years, and knew it to be nothing more than a common paving stone. Mr. Mitchell asked leave to wrench it up. A pick was procured, and, to the surprise of Dr. Johnson, the "stone" was buried about eighteen inches deep, and beneath the ground was a perfect six-sided prism of crystal, almost as pellucid as French cut glass. The young man knew enough of geology to recognize it by the butt end, above the ground, though none but an expert would have seen in it anything but an ordinary boulder, on a small scale. A little learning may be a dangerous thing; but somehow or other knowledge is quite as productive as ignorance.

Benefits of Harvesting Machines.

A correspondent of the *Prairie Farmer*, says in reference to reaping machines, that "it has long since become an acknowledged fact that no nation has made such rapid progress in improvements in labor-saving machines as our own; and more especially is this true of agricultural implements. The fame of our reapers, threshers, &c., has become world wide; and the value of these and similar inventions to our own people is beyond the power of any man to estimate. It is only when we consider the immense grain crop of our country—the eight Northwestern States alone furnishing 520,000,000 bushels per annum—and realize the utter impossibility of gathering it without the aid of these machines, that we can begin to appreciate their value to us as a people. The most of these improvements have been made within the last quarter of a century, and their progress has been constantly accelerated, increasing annually in arithmetical ratio. As we are mainly an agricultural people—that being the great interest of the nation, upon which all other interests are based—it becomes highly important that our agriculturists keep themselves fully posted as to all improvements which may aid or cheapen their labors, or increase their products. Nearly or quite all these improvements or inventions are connected more or less directly with patents.

Extraordinary Endurance of a 13-inch Cast-iron Gun.

The first 13-inch Dahlgren gun made by the Builders' Iron Foundry, Providence, R. I., was subjected, during last week, by agents of the Government, to the most severe powder test ever applied to any gun in this country, if not in any country. It burst on the 26th ult., at the 178th round. The gun in its finished state weighed 36,000 pounds; and the test applied was 30 pounds of powder for the first 10 rounds, 40 pounds for the second 10 rounds, and 50 pounds for the remaining 158 rounds. The powder employed was much finer than is used in service, and of course its explosive power was proportionately greater. The 15-inch guns on board the *Monitors*, were tested with 30 pounds of powder, and have never been used with a larger charge than that; but deeming it necessary to use heavier charges behind solid shot of the great weight used in these guns, this gun was made of greater proportional weight of metal than the 15-inch gun. The ball used at each charge weighs about 350 pounds, and exactly fits the bore.

This gun was tested at the risk of the Government, and the company which made it have orders to proceed with the manufacture. They have already cast two others of the same size. No one was injured by the immense fragments which blew off when the gun burst.

MISCELLANEOUS SUMMARY.

Tin-lined Lead Cisterns and Pipes.—At a late meeting of the Liverpool Chemists' Association, specimens of lead pipe and sheet lead, electro-plated with tin, were exhibited by Mr. Holt; and some discussion ensued respecting the use of lead coated in this manner for water cisterns and pipes. It appeared to be the opinion of the meeting that a coating of tin, instead of preserving the lead, was far more likely to ensure its more rapid corrosion; for if the coating of tin by any means happened to be scratched off, even to the slightest extent, galvanic action would take place, and the lead would be destroyed very quickly. Dr. Nevins and Dr. Edwards stated that their experiments had proved that such would undoubtedly be the case: Dr. Edwards remarking that in one case which he had examined, a cistern made of lead, in which was an accidental admixture of tin, was eaten out by well-water in six months, the lead being rapidly precipitated in the form of sulphate, &c.

Remains of Gigantic Animals.—Russian geologists are making preparations to promote the discovery of congealed remains of mammoth animals in Siberia. It is stated that during the last two centuries, at least 20,000 mammoths, and probably twice or thrice that number, have been washed out of the ice and soil in which they were imbedded, by the action of the spring floods. The tusks only have been preserved for their commercial value in ivory. An effort is now to be made for the discovery and preservation of one of these carcases as perfect and entire as possible, as it is considered that microscopic investigation of the contents of its stomach might throw a powerful light on a host of geological and physiological problems.

Raspberry Wine.—Bruise the finest ripe raspberries with the back of a spoon; strain them through a flannel bag into a stone jar; allow one pound of fine powdered loaf sugar to one quart of juice: stir these well together, and cover the jar closely. Let it stand three days, stirring up the mixture every day; then pour off the clear liquid, and put two quarts of sherry to each quart of juice or liquid. Bottle it off, and it will be fit for use in a fortnight. By adding Cognac brandy, instead of sherry, the mixture will be raspberry brandy.

A Discovery, it is said, has been made in Russia, whereby the mercury used in the manufacture of looking-glasses may be so hardened as to bid defiance to humidity, friction, or blows. The plate-glass thus prepared may be transported without fear of damage; and, the silvering being accomplished by a cheaper process than any yet known, the glass is ten or twenty per cent cheaper than at present.

"One Word More."—A clerk in the Dead Letter Office, of an inquiring mind, was curious to find out how many letters were written without a postscript. One day last week he found that out of six thousand eight hundred and fifty letters written by females, only three hundred and seventy-five were without postscripts. Some of the other letters contained three.

A Wooden Library.—An odd work is being carried out for exhibition at the Permanent Industrial Exposition in Vienna. It is a wooden library—that is, a hundred octavo volumes, the covers of which are formed of wood; the backs of bark, inscribed with the names of the trees they are made from; and the interiors of specimens of the leaves, flowers, fruits, &c., of the trees.

Augusta, Maine, is one of the largest (not most populous) cities in the world. According to the Kennebec *Journal* it contains sixty square miles. In some of the wards they kill wild bears.

On the 4th inst. a mason fell from the top of the chimney of the Morgan Iron-works, in this city, and was instantly killed; the chimney is upwards of 160 feet high.

A member of the Connecticut legislature, who possesses the Yankee passion for whittling, and indulges extensively in that amusement, received one day last week a bundle of shingles by express.

Seven first-class locomotives were turned out from Rogers' Locomotive Works at Paterson, N. J., during the month of June.

The Philadelphia *Ledger* states that up to July 9th there have been 1,683,333 tuns of coal transported this year upon the Philadelphia and Reading Railroad, against 1,124,941 for the same period last year. By the Schuylkill Navigation Company there has been transported in the same time 333,385 tuns against 377,937 for the same period last year. The coal produced thus far exceeds that of last year for the same time by 513,840 tuns.

The French preserve grapes the year round by coating the clusters with lime. The bunches are picked just before they are thoroughly ripe, and dipped in lime-water of the consistency of thin cream. They are then hung on wires, and when dry are dipped the second time, and then hung up to remain. The lime coating keeps out air and checks any tendency to decay. When wanted for the table. dip the clusters in warm water to remove the lime.

Wrought-iron Cannon.—A firm in Bridgewater, Mass., are making a gun from wrought iron, which will weigh, when completed, about seventeen tuns. It is forged solid, in an octagonal form, with the cavity bored out thirteen inches in diameter, and will be hooped with strong bands of iron put on by hydraulic pressure. The lathe on which the metal is being turned is one of the largest in the world.

Labor.—Would you be an honest man and enjoy competency with pleasure, unknown to hasty wealth or sly roguery? Work! Let your sweat-drops wash your gains from all dishonesty. You shall live to tell your children that you have observed and felt the wisdom of the royal preacher:—"Wealth gathered by vanity shall be diminished, but wealth gathered by labor will increase."

The Pearl-bearing Oyster.—The great pearl-fishery of Aripo, in Ceylon, which has been in abeyance for some years, is about to be renewed under very promising auspices. The bank producing the pearl-bearing oysters is seven miles long, and two and a-half broad, and is calculated to contain between two and three million oysters.

Remedy against Moths.—One ounce of gum camphor, and one ounce of powdered red pepper, macerated in eight ounces of strong alcohol for several days, then strained. With this tincture, the furs or cloths are sprinkled over, and then rolled up in sheets. This remedy is used in Russia under the name of the Chinese Tincture for Moths.

New Invention.—A genius down East intends applying for a patent for a machine which, he says, when wound up and set in motion, will chase a hog over a ten acre lot, catch, yoke, and ring him; or by a slight change of gearing, it will chop him into sausages, work his bristles into shoe-brushes, and manufacture his tail into a cork-screw.

The project of establishing telegraphic communication between the West India colonies, is being agitated in London. A deputation from the West India Committee, lately had an interview with the Duke of Newcastle, at the Colonial Office, when the subject was discussed.

Old St. Paul's.—The ball on top of the dome of St. Paul's, London, weighs 5,000 pounds and is 6 feet in diameter. Workmen are engaged in re-gilding it, and they are watched by crowds of people through telescopes as they work at the giddy hight.

The largest mass of rolled iron exhibited in the London Exhibition of 1851, weighed one tun and a half, and this was considered extraordinary. In the Exhibition of 1862, the heaviest specimen weighed no less than thirteen tuns.

Indian Seas and Birds.—The absence of sea-birds forms a singular trait in the character of the Indian seas; scarcely a single living thing appears in the sky above, or the sea below, betwixt Bombay and the Indus.

Omnibus Steamboats.—Some wonderfully fast little omnibus steamboats have just been put on the Seine to run between Paris and St. Cloud. It is impossible to keep pace on horseback with one of them.

A Large Tax.—A. T. Stewart, the dry-goods prince of New York, recently paid the snug little sum of $60,000, as his income-tax for the past year.

The coal-traders of Philadelphia have decided to ship no more coal for the present. This will tend to increase the price.

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Importance of our Sheep Husbandry.

The United States *Economist* contains an elaborate and well-written article on the importance of sheep husbandry to the loyal States, from which we condense some interesting ideas which are worthy of the attention of all our farmers :—

"For years past the quantity of wool manufactured in the United States has averaged full 125 millions of pounds. Of this quantity not more than one half has been grown here. While we have been exporting grain and provisions to an immense amount, we have imported wool from Australia, the Cape of Good Hope, South America, China, Russia, India, and in short from every other quarter of the globe, and are doing so to-day, though it is an indisputable fact that no country on earth is better adapted to sheep husbandry than the North-west. Should the agriculturist neglect to grow a sufficient quantity of wheat and corn to supply our home demand, it would be regarded as a most surprising evidence of lack of enterprise, and yet facilities of soil and climate are no better for producing corn and wheat than they are for the growing of sheep. In Australia and the Cape of Good Hope, where sheep husbandry is carried on extensively and at a large profit, the climate is not so favorable, the soil is barren, and there is no market for mutton ; while in the West the soil is rich, the climate dry and cool, and our large cities furnish a ready market for mutton, at higher prices than in London and Paris. For years past the people of the West have seen the wool-buyer running through the country eager to contract for wool "on the sheep's back." How much more will they be in the future, when the consumption of wool has increased fifty per cent, as it is likely to be! Although the clip of wool will be larger this year than upon any former occasion, still our Western farmers do not realize the immense increase of the demand which will be created for this great staple by the cutting-short of the cotton supply. We have at present in the loyal States twenty-five millions of sheep, and we believe that this number could be doubled without producing a sufficient quantity of wool or mutton to supply the demand for the next five years. There is no mystery about sheep husbandry. All that is required to conduct the business successfully is the exercise of plain common sense, which dictates that all domestic animals (and sheep in particular), to thrive well, require to be well fed, to have plenty of room and to be protected from storms. The soil and climate of the North-western States are admirably adapted to sheep husbandry, and the farmers of that section could not possibly turn their attention to a more profitable branch of agriculture. The sheep best adapted to the production of worsted are the Leicester and Cotswold breeds, and can be obtained in Canada to any extent and at reasonable prices. The carcasses are large and the fleeces of long staple, which makes these breeds more valuable both for the clip and mutton."

The Culture of Water-cress.

The water-cress is cultivated upon an extensive scale in the adjacent districts of country for the London market. The following description of its cultivation is from the "Cottage Gardener's Dictionary :"—The trenches in which water-cresses are grown are so prepared that, as nearly as possible, a regular depth of 3 or 4 inches can be kept up. These trenches are 3 yards broad, and 87 yards long, and whenever one is to be planted the bottom is made quite firm and slightly sloping, so that the water which flows in at one end may run out at the other. If the bottom of the trench is not sufficiently moist, a small body of water is allowed to enter to soften it. The cresses are then divided into small sets or cuttings, with roots attached to them, and these are placed at a distance of 3 or 4 inches from each other. At the end of five or six days a slight dressing of well-decomposed cowdung is spread over all the plants, and this is pressed down by means of a heavy board, to which a long handle is obliquely fixed. The water is then raised to the depth of 2 or 3 inches, but never higher. Each trench is thus planted annually, and furnishes twelve crops during the season. In the summer the cresses are gathered every fifteen or twenty days, but less frequently during winter ; care is taken that at each gathering at least a third part of the bed is left untouched, so that neither the roots may be exhausted nor the succeeding gathering delayed. After every cutting, a little decayed cowdung, in the proportion of two large barrowfuls to each trench, is spread over the naked plants, and this is beaten down by means of the rammer above-mentioned. After the cresses have been thus treated for a twelvemonth, the manure forms a tolerably thick layer at the bottom of the trench, and tends to raise its level. To restore it to its original level, all the refuse should be thrown out upon the borders which separate the trenches from each other. These borders may be planted with artichokes, cabbages, or cauliflowers."

The Effects of Congelation upon Water.

Dr. Robinet, a member of the Academy of Medicine, Paris, has published an account of experiments conducted by him to test the effects of congelation upon drinking-water. It is well known that the ice which is formed in the sea yields nothing but fresh water, all the salt having been eliminated by congelation. In the Northern parts of Europe this property is turned to account for the extraction of salt from sea water ; for a large sheet of the latter having been left to freeze, the ice is afterwards cut away, and the unfrozen water left below is so rich in salt as to require very little evaporation to yield it in a solid state. This property will also serve to analyze wine. Suppose it was required to determine the quantity of water fraudulently added to a certain wine ; by exposing it to the action of artificial refrigeration, all the water would be alone, and the wine left in its purity. By a similar process, ships at sea, being short of water, might be supplied with this necessary article. We will suppose the temperature of sea water under the tropics to be 30° centigrade. If a quantity be exposed in a vessel to the action of a mixture of sulphate of soda and hydrochloric acid, two very cheap commodities, the temperature of the water will fall to 10° below freezing point. Let it then be exposed to a second mixture of the same kind, generally eight parts of sulphate to five of the acid, and the temperature may be lowered to 17° below freezing point. Congealed water is then obtained free from salt, and may be used with impunity. Dr. Robinet has added a new fact to this theory by showing that the water of springs and rivers loses all its salts by congelation. These salts are chiefly those of lime and magnesia. The water subjected to experiment was that of the lakes of the Bois de Boulogne, the ice of which was found to be entirely free from the above-mentioned salts. Such, indeed, is the chemical purity of the water thus obtained, that it may in most instances be substituted for distilled water.

Punctuality.

Among mechanics, punctuality is a great desideratum. Show us a mechanic who will get our work done by the time specified, and we will cherish him as the apple of our eye. But to the mechanic who makes us call twice (fire and sickness excepted), we bid farewell—"a long farewell"—he is not the man for our money. The mechanic gains nothing by false promises except a bad name. In order to grasp at all the work in the neighborhood many a mechanic will promise, when he knows it is not in his power to *perform*. What is such a man but a liar? To say nothing of the vice of lying, than which there is nothing more low and contemptible, the mechanic, in the end, gets far less work by false promises than he would by a strict adherence to the truth. *Punctuality* in a mechanic is the soul of business, the foundation of prosperity, and the security of a good reputation.—*Exchange.*

THE CONSUMPTION OF WOOL.—The consumption of wool in the United States during the past year has been unusually large, amounting in the aggregate to some 126,000,000 pounds. The quantity of raw material required for army supplies alone, during the past year, is estimated at 50,000,000, for the navy 1,000,000, for civilians' wear 65,000,000, and the amount required to replace cotton, formerly incorporated to a much greater extent in mixed fabrics, 10,000,000 pounds.

A WESTERN editor says of a hail storm on the lakes in his vicinity, that it came so suddenly that the pilot looked round to see which one of the passengers was throwing stones at him.

Dialysis.

The term dialysis is applied to a method of separating different substances in solution by membraneous tissues, and was discovered a few years ago by Professor Graham of the British Mint. He noticed that certain substances possess the power of diffusing themselves with great facility through water in comparison with others, and that they could be separated mechanically in solutions by proper appliances. Take four deep glass vessels, such as long phials, and place in the one a few grains of common salt ; in the second an equal quantity of sugar ; in the third some gum ; in the fourth dried albumen. Let each of the glasses now be filled up cautiously with water, and their contents allowed to stand until they are dissolved by the water. These substances gradually diffuse themselves through the water, but not all in the same period of time. The salt diffuses most quickly, then the sugar in about twice the length of time ; the gum takes four times longer, while the albumen takes about twenty times longer. So different is the diffusive power of common salt and albumen in water that, if the two substances in equal quantities are mixed together in water, the salt will completely diffuse itself through the water before the other is dissolved. Substances which are crystalline are the most diffusible ; those least so which resemble gum, glue and albumen. The names *crystalloid* and *colloid* have been given to these two classes of substances. The crystalloids also possess the remarkable property of diffusing themselves through solutions of the colloids almost as rapidly as through pure water ; while the latter do not possess this property.

A colloid and crystalloid in solution may be separated as follows:—Take a hoop, like that of a common wire sieve, and cover its bottom with parchment paper, and float this vessel on clean water contained in another vessel, then pour into it a solution of common salt and albumen. In a short period afterward, the salt will diffuse itself through the parchment, and leave the colloid or albumen behind. In this way compound crystalloid and colloid solutions may be separated. The parchment vessel is called a dializer. Dialysis may be usefully employed in a great number of cases of chemical analysis to facilitate operations. Flint, which is one of the most insoluble of substances, has been obtained dissolved in pure water by the aid of the dializer. It cannot be dissolved in its natural state, but is first rendered soluble by a chemical process, then boiled in water, and afterward separated by the dializer. Thus the flint is first fused with an excess of soda (or potash) which converts it into soluble water glass, or silicate of soda. It is now treated with hydrochloric acid, which unites with the soda and forms common salt. The latter is a crystalloid, the former a colloid. When placed in a dializer the salt solution passes through, while the silica is left behind, and when it is allowed to stand for some days it solidifies.

A SUBSTITUTE FOR LEATHER.—Leather, to a great degree, is to be superseded. The London *Times* endorses the claims of an invention, owned by a Mr. Szerelmy, of England, which, according to the description of the article, possesses every quality of the real leather, and is vastly superior to it on many accounts. It will not crack, is tougher, will wear longer and will resist water as effectually as rubber. The leather-cloth can be of any color, and a pair of boot tops which cost of calf-skin, $1 50, will cost, of this material, only 25 cents. The invention is of immense value.—*Exchange.*

[A very full and complete account of this invention can be found on page 354, Vol. VIII. (new series) of the SCIENTIFIC AMERICAN.—EDS.

THE ram *Dunderberg* is well under way, and hopes are entertained that she will be launched on or about the middle of September. The plan of the ship, externally, is very well outlined in her present condition, and she is certainly the largest mass of solid wood, in ship form, that we have ever seen.

A FEW nights since, a large section of the rock on the north or Canada side of Niagara Falls fell into the yawning abyss below, giving the Falls on that side a more decided horseshoe appearance than they had before.

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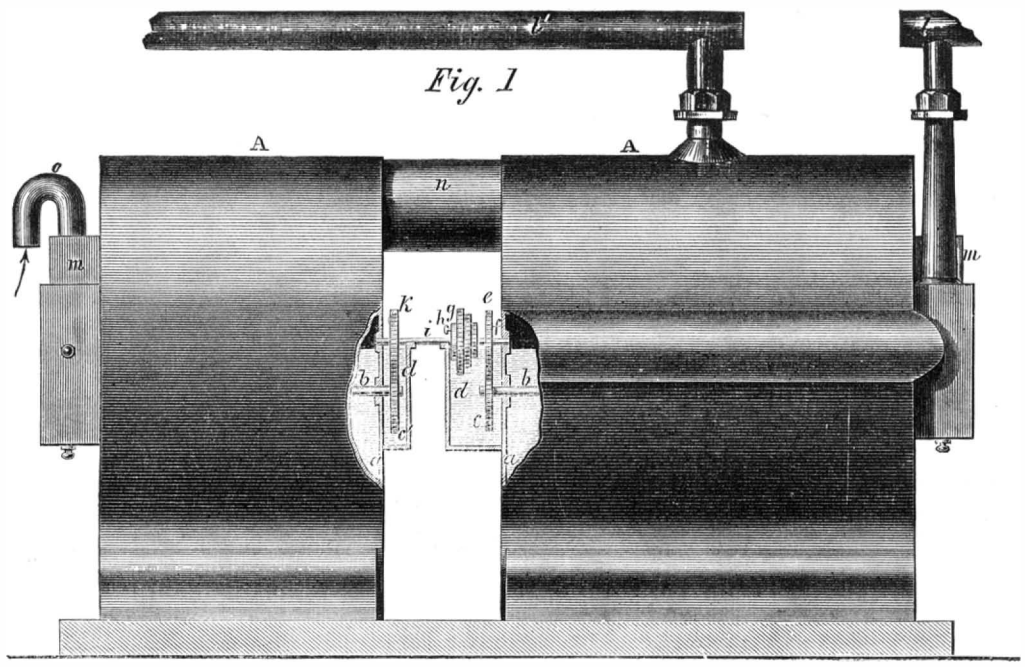
Improvement in Gas made from Petroleum or other Hydro-carbons.

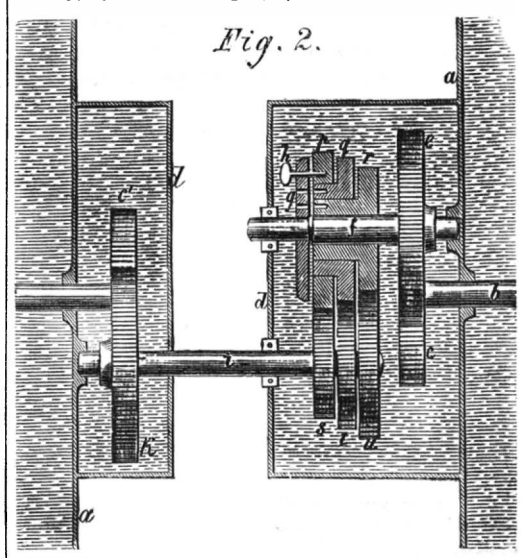
Since the blockade of the Southern ports has been enforced, the use of rosin for gas-making purposes has been necessarily dispensed with, and most of the small private works, through the country, that depended on it, now use petroleum-tar or other hydro-carbon oils as a substitute. One of the principal difficulties experienced in the use of petroleum has been that the gas made has such an excess of carbon that it will not burn through an ordinary coal-gas burner without smoke, thus rendering its use offensive and deleterious to health and furniture. By reducing the burner to a very small size, this has been partially overcome, but other practical difficulties have arisen; the flame is very weak, liable to be affected by draughts of air, and is not of a clear white color. To obviate this many attempts have been made to decompose water, and mix its hydrogen with the rich hydro-carbon petroleum gas; thus forming what has been known as "water gas." These experiments have been unsuccessful in most instances, owing to practical difficulties; one of which has been the want of uniformity in the quality and quantity of the hydrogen gas, thus producing a variable and inconstant light. The device herewith illustrated (the inventor claims) has entirely overcome these difficulties, as proved after the experience of many months practical working under the most severe tests, in several places. It is now in successful operation at the St. Nicholas hotel, in the city of New York, supplying about 3,000 burners.

The object accomplished by this invention is to reduce the heavy rich gas obtained from the tar of petroleum with atmospheric air, after it passes from the gas-holder, and before it reaches the burners. The air is mixed in variable proportions to suit the quality of the gas made, giving the light the greatest illuminating power. It burns with a white flame, free from smoke, through any ordinary burner. Gas mixed with air is not explosive, until the proportion of air is from 80 to 90 per cent., so that this process is entirely free from danger, 50 per cent. of air being the maximum. Although air is about uniform in quality, the gas made from petroleum is not uniform, varying with the quality of the oil, the temperature of the retorts, and the manner in which the oil is supplied to them. Consequently the same per-centage of air will not always produce the same economical result in lighting, or prevent the gas from smoking. These difficulties have been removed by this simple contrivance, which may be attached to the delivery pipe of any oil gas-works, between the gas-holder and the burners, without other alteration of the works. The nature of the invention consists in combining two ordinary gas meters, or other apparatus for measuring gas, in such a manner that the operation of one, by the pressure of gas, will transmit a positive motion to the other, which acts as an air meter; the devices employed for transmitting this motion being so arranged that the relative speeds of the two instruments, and the quantity of gas and air measured by either of them, may be instantly varied and adjusted to the desired proportion, making the mixture required to give the most perfect light through an ordinary gas-burner; the relative proportions used are recorded on the index of each meter. In order that the invention may be fully understood a reference to the accompanying engraving will show the arrangement of the machine.

Fig. 1 is an elevation of the two meters, with the mechanism for the improved mode of adjusting the relative quantities measured by the instruments, and Fig. 2 is a sectional plan of the connecting machinery. A A, are meters of the class termed "wet meters," of the ordinary construction; they are placed back to back with sufficient space between them for the introduction and management of the connecting machinery. The axles or shafts, *b b*, of the inside drums of the meters, pass through the outer casings, *a a*, of the meters, and are provided with spur wheels, *c c'*. In order to avoid the friction of stuffing-box journals, both meters have cases, *d d*, attached to them, surrounding the said wheels, and extending above the water level of the meters. The wheels are thus made to revolve in the water contained in these casings, which communicates and remains on a common level with the water in the interior of the meters, preventing any leakage of gas through the bearings of the shafts. A spur wheel, *e*, gearing with the wheel, *c*, revolves a shaft, *f*, and has at the outer end of its long sleeve bearing a disk, *g*, attached: (see Fig. 2), the intervening space being occupied by three wheels, *p q r*, of various diameters; these wheels are so fitted that each is independent of the others in its movements, and that either one may be attached to the disk, *g*, by means of apin, *h*, while the others remain idle; *i*, is a shaft extending across the whole space between the meters, and having its bearings attached to the water boxes, *d*, or the exterior of the meter. This shaft is at one end provided with the wheel, *k*, gearing with the wheel, *c'*, and has upon its other end the wheels, *s t* and *u*, of such relative diameters as to bring them in gear with the wheels, *p q r*. It will at once be evident that with the above combination of wheels the proportion of speed of the two meters may be subjected to three variations, by simply changing the position of the pin, *h*, so as to throw either one of the wheels, *p q r*, into action, and by the introduction of more wheels, the number of variations in the relative capacities of the two meters may be increased to any desired extent. *l*, is the ordinary delivery pipe from the gas holder, connected with the inlet pipe of the mixer for conveying the pure gas; and *l'* is the outlet pipe for the mixed gases. The register indices, *m m*, show the amount of air and gas, separately, that passes through the instrument. The pipe, *n*, connects the two meters through which the air passes to the outlet pipe for the mixed gases. The pipe, *o*, admits the atmospheric air into the meter.



PARRISH'S PATENT GAS-MIXER.



This invention was patented on May 12, 1863, by William D. Parrish, of Philadelphia, Pa.; for further information apply at the Gas-works of the St. Nicholas Hotel, No. 63 Mercer street, New York, where the machine can be seen in operation; or address D. Parrish, Jr., Gas Engineer, St. Nicholas Hotel, New York; or Wm. D. Parrish, 1,416 Arch street, Philadelphia.

The "Monitor" Torpedo.

It has been claimed for the rebels that they set us a lesson in the use of torpedoes attached to iron-clad vessels to blow up any vessel with which they may come in contact. This is a mistake. The *Monitors* were the first to have these torpedoes attached, though our naval officers seemed afraid to use them. The New York *Herald* says:—

"The Monitor torpedo consists of a monster shell, thirty feet long, weighing upwards of 6,000 pounds, with a charge of 700 pounds of powder. By means of a raft—the 'devil'—these shells are pushed some fifty feet ahead of the monitor, suspended at any desirable depth. We shall know in good time how the rebels succeed in obstructing the passage of the *Monitors* when armed with these terrible shells, the explosion of which will resemble an earthquake under water. It appears that the naval officers were afraid of employing the potent means placed at their disposal for clearing Charleston harbor of obstructions, for fear the explosion of the shells would act backwards on their vessels. As might be supposed, the constructor has guarded against such an occurrence. The Secretary of the Navy, with a view of removing all doubts on this point, ordered a trial to be made last winter with one of the rafts, the very 'devil' afterwards towed to Port Royal. The trial proved eminently satisfactory; for, although the shell pushed up a mountain of water fifty feet high above the surface of the Hudson, near the head of the raft, not the slightest injury was sustained by the latter. The perfect preservation of slender pieces of wood attached under the raft, proved beyond a doubt that the effect of the explosion was, as had been designed, in the forward direction only. This singular feature of the Monitor torpedo we are not at liberty to describe. What we have stated on the subject can do no harm, as it is known at Richmond as well as at Washington. So also is the fact that a couple of shiploads of these under-water pioneers are now at hand where their good services are most needed. We therefore acquit Mr. Welles on the charge of want of enterprise as regards the torpedoes. But is it not time to order Admiral Dahlgren to put steam on the *Monitors* and push the torpedoes past Sumter up against those rebel obstructions?"

THE large coffee speculators have not all made a good thing out of their "little enterprises." The price has become so enormous since last year, that thousands of families have entirely discontinued the use of coffee, and immense lots of the article remain on the speculators' hands in New York and elsewhere; they losing the interest.

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NEW YORK, SATURDAY, JULY 25, 1863.

ARMY BREAD---HEALTH OF SOLDIERS.

Our soldiers, when in active field-service, we have been informed, are subject to dyspepsia and dysentery. When affected with either of these diseases, even for a limited time, a soldier becomes feeble and unfit for duty. The causes and prevention of these maladies should form a subject of earnest inquiry. A person with whom we recently conversed, who has had two years' experience in the army of the Potomac, and who had been a prisoner for some time in Richmond, stated that when our soldiers were fed for several weeks on "hard tack" (the name for army biscuit) and pork, their stomachs became disordered and dysentery followed. He stated that although food was less abundant in the secession army, the men were very healthy, and he attributed this condition to the use of fresh flour as part of the rations of the secession soldiers. For want of bakeries in the South to manufacture biscuit, flour and corn meal were served out to the soldiers, and they were accustomed to make cakes in camp and bake them on griddles—sometimes formed of flat stones. Another person of considerable experience in the army, with whom we have conversed, confirmed the statement as to the frequency of dyspepsia and dysentery in the army, stating his belief that these diseases were due, in a great measure, to inferior bread. He asserted also that the contract taken for this month to provide this bread was as low as 3.94 cents per pound, including boxing, &c., all ready for delivery. Thus the contract calls for bread to be made of *extra State flour*, which, at the rate of $5 80 per barrel, will yield 180 pounds of bread if thoroughly baked, for which $7 10 is the sum that will be received from the Government. Our informant states that it will cost for the flour, packing, and boxing, not including the expenses of baking, $7 77. He therefore concludes that an inferior quality of flour must be used in making the army bread, and that it is not sufficiently baked—a considerable amount of moisture being left in it. He also states that this bread is baked in ovens heated with the products of combustion which pass from the furnaces through perforated flues direct into the ovens. In other words, the bread is baked in a heated atmosphere of carbonic oxide and acid gases. The opinion was given that the bread thus baked absorbed carbonic acid gas, and was thus rendered injurious to the stomachs of the soldiers, tending to "poison their systems." We are also told that it is very difficult to heal the wounds of our soldiers in hospitals, which fact is attributed to the use of unwholesome bread.

We are aware that while carbonic acid gas is poison to the lungs, it is not injurious to the system when taken into the stomach in moderate quantities. It does not, therefore, seem to us probable that the gas in the bread baked as stated can be the cause of the diseases in our army. That the evils stated do exist in our army to some extent there can be no doubt, but we believe that they have been greatly exaggerated. We have directed attention to the hard army bread as the possible cause of such diseases; this is the opinion of persons who have had opportunities for extended observation in the army. They may be mistaken in their conclusions, but whatever may be the causes of these maladies they deserve investigation, and they should be removed if it is in the power of man to do it. Our soldiers who have gone forth to peril their lives for the support and perpetuation of the Government, deserve to receive the best food that can be provided.

CONSERVATISM AMONG MECHANICS.

Tradition is a good thing in its way, but mere blind reliance upon it sometimes leads men astray. The teachings of the past, applied to the arts, form what is termed experience, and by recalling to mind exigencies where extraordinary means have been employed to overcome difficulties, men perform duties with more ease and certainty than if they had not such memory at their service. The reader may ask, "Suppose a man has not had extensive experience in some branches of his business, how shall he thus familiarize himself with them?" We answer, inform himself by taking advantage of every means within reach that lead to the desired end. Conversations with practical men; consultations with books or papers devoted to the specialty he wishes to become acquainted with; these have an important influence which cannot fail to be an advantage to the student.

The mechanical ideas of this age of the world lead men ever onward; that is to say, that every hour discloses some vital question on which the masses of mechanics are ignorant because they have never given attention to the subject; as, for instance, the most impenetrable armor; the most deadly gun, rifled or smooth bore; the best forms for the hulls of batteries and iron-clad ships; and countless other points which will suggest themselves to all. This is why we say the spirit of the age leads ever onward, and hence the necessity which exists for investigating the labors of those who have preceded us. Is it not palpable to every one that the individual who has a knowledge of three or four different processes of doing the same thing, is a far more valuable member of society than he who adheres obstinately to his old-time method in the firm conviction that *it* alone is worthy of attention? Most undoubtedly. Yet we go over workshops and see men at work with tools that the best authorities have discarded long ago as useless, and have superseded them by more efficient ones; we see lathes in use with narrow shears, small spindles, light screws; planers with chains instead of screws or racks, and pinions, chain-feed on the lathes aforesaid, and other exploded and thrown-aside devices that time has outstripped and supplanted by more efficient ones. These are the old-school men, and they would succeed much better in business if they took advantage of the discoveries and theories reduced to practice by other men. Pull out the old-fashioned machines and replace them with others better capable of doing the work! They occupy room and waste time every day that ought to have been economized.

GENIUS.

It is a somewhat remarkable fact that the children of celebrated men by no means inherit the peculiar talent of their parents or parent. History, past and present, is full of instances which might be quoted to prove the truth of this assertion; and the reader has only to reflect to call to mind, among those of his own day, statesmen, who, dying, left behind them an enviable fame, yet transmitted no portion of the genius which acquired it to their progeny. So all experience in the Old World goes to sustain the fact that genius is by no means hereditary, but latent. A wise father may have a fool for a son, and *viceversa*. May we not fairly question whether mere genius is of any particular value to its possessor? We say genius alone; a mere faculty for constructing, an aptitude for mechanical pursuits, or a love for the fine arts; all these, uncultivated and misdirected, are rather an incumbrance, and a disqualification for sterner work than any direct advantage to individuals. We have often heard, and not without regret, of certain young men, distinguished by their admirers as "geniuses," (to coin a word for the occasion) and upon investigation have found such claims based upon a sort of sleight-of-hand, which enabled them to whittle very bad imitations of boats, out of blocks of wood that might be made serviceable for some better purpose—boats that neither swim nor sail, but topple over like nut-shells and have an obstinate desire to move sideways. These productions are viewed by fond parents and relatives, as the first efforts of a remarkable genius—one who shall put George Steers' fame far in the shade, and outstrip all previous efforts in shipbuilding. The same facts may be noticed in the case of painting, a talent for modeling in clay, and kindred branches of art.

Far be it from us to disparage the first efforts of self-taught, persevering men. These remarks by no means apply to them; but are directed toward that class of idle, whining, shiftless young men who lounge in the house, wear out their clothes and the patience of their families by homilies on "fate," "destiny," the "coldness of the world," and similar phrases—the stock in trade of "geniuses" all over the world. To such young men we would say your talent lies in handling an ax; your genius is concealed in the handle of a blacksmith's hammer; get up and learn a trade; get out of the rocking chair and go to the forge, and if you have any genius inert and dormant in you, it will soon work its way to the surface and shine among men. We have observed a great many so-called "geniuses" in this world, and seen some of them grow to manhood. They generally have some remarkable model of a steamship that will sail 40 miles an hour on about a pound of coal. They are out at the elbows, and of a generally dispirited cast of countenance; they are sanguine on perpetual motion, and, much more modest than Archimedes, only require a peculiar spring or a screw to move the world; and it is with no little regret that we have seen their feeble efforts baffled and set aside because they were not thoroughly and earnestly prosecuted. There is nothing more certain in the world than that real talent and genuine genius is certain of its reward, if it only manifests itself in a proper way. Men are not generous enough to each other to go searching about the world for the light that is hidden under a bushel, and if any individual thinks to attract the notice of his fellows by the dismal glimmer of a penny "dip," set in a candlestick of surpassing beauty, he may abate his pretensions at once and for ever. Set to work in earnest, oh, young men of the nation!—turn in and fall to, on the work of the world! War leaves the fields desolate, the loom idle, the workshop as silent as the cemetery. Bestir yourselves! and if you have genius, make it evident by producing something to set in motion the forces that falter. Make the wilderness blossom as the rose, cause the shuttles to fly more swiftly to make up for lost time, and make the ponderous hammers to rise and fall with increasing velocity. If you have genius, let it shine! bring it out, and bestow it upon mankind, and in return, your fellows of the present day, and posterity also, will concede all that your vanity now prematurely claims.

REPORTED FAILURE OF THE STAFFORD PROJECTILE.

Commodore Turner on board of the iron-clad *New Ironsides*, in obedience to official instructions, has lately experimented with the "Stafford projectiles." He states that every precaution was taken to give them a fair trial, the instructions for their use being carefully observed. They were fired with 16 pounds No. 7 powder, from the 150 pound Parrott guns of the *New Ironsides*. "In every instance," says the Commodore, "they failed, and in the four first discharges, the casing of wood in which they are imbedded was shivered to pieces immediately, and so near the ship as to make it perilous to use them. I am convinced that with this class of gun they are utterly useless; I should not think of using them in action, after the experience I have had. I desire to make a very emphatic report to the Bureau on this subject, for either these projectiles are a great imposition, or the instructions accompanying them have been misinterpreted as to the manner of using them."

It is stated that each of these projectiles cost $46, and that a charge of $60,000 has been made against the Government for a quantity furnished.

The Stafford projectile has heretofore been regarded as one of the most wonderful and valuable auxiliaries of war. Repeated experiments had demonstrated its marvellous success; reports of various tests to which it has been subjected have appeared in the col-

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umns of the Scientific American. Many of these trials were made under the direction of experienced Government officers, specially appointed for the purpose, and they appeared to establish the fact that the invention was one of a remarkable character. Some of the targets were clad with 6 inches of iron, with a strong wood backing; but the projectiles passed through the mass without the least difficulty. In other instances the projectile has been thrown a distance of 4½ and 5½ miles. Of course no such results could have been obtained had there been any tumbling or other defective operation of the shot. We are constrained to believe that in Commodore Turner's trial there was either some mismanagement in the handling of the shot, or some defect in their construction. We must have further evidence of failure before we give up our faith in what has heretofore been demonstrated to be a good invention.

One of the peculiarities of Stafford's projectile is that it is generally made smaller than the bore of the gun, the intervening space being filled up by wood or other casing, attached to the shot. This casing flies from the shot when the latter leaves the gun, giving the projectile a free flight. It is alleged that by this method a large area of explosive force is made to act effectively upon a projectile of small diameter. Immense velocity and great penetrative power are thus obtained. Engravings of the Stafford projectile will be found in No. 14, Vol. VIII (new series) of the Scientific American.

DISTILLATION AND EFFECTS OF HEAT.

There are two kinds of distillation, which are entirely distinct in their nature and results, and by which the effects of heat in changing the character of substances are exemplified in a most remarkable manner. These processes are called *common*, and *destructive* distillation. The former consists in applying a moderate degree of heat to a substance, such as water by which it is converted into vapor, and after this it is again converted into water by refrigeration. Or it is perhaps more clearly explained by the treatment of a liquid, such as a mash of malt, which contains ardent spirits combined with water. By the application of a lower temperature than that of boiling water, to the mash in a still, the spirits pass over in the condition of vapor, are condensed in a refrigerator, and thus they are separated or distilled from the mash. This is common distillation, by which no chemical change is effected in the nature of the substances treated. The water is first converted into vapor by heat, then converted into water again by cold; and as the spirits boil at a lower degree of temperature than water, they are separated from the water by distilling at a low temperature, and then are converted into a liquid state again by cooling.

Destructive distillation consists in applying a high degree of heat to substances in retorts, by which products of an entirely different chemical character from the substances treated are obtained. Some of the most astonishing results connected with modern chemistry and the practical arts are due to destructive distillation. For example, when a charge of bituminous coal is placed in a retort raised to red heat, a great portion of this solid is converted into the gas which is used for illumination, and it will flow unchanged for miles through tubes exposed to the lowest atmospheric temperature. Common oil subjected to the same treatment will also produce gas, but it is not converted by refrigeration into oil again. Many liquids and several solids subjected to such a degree of heat, produce similar results; hence as the character of the products is entirely changed by the operation, it has been called destructive distillation.

The wonderful effects of heat in distillation are shown in the variety of products obtained, and the study of these deserves general attention. For example, in the distillation of cannel coal, a different chemical product is obtained with almost every different degree of heat to which the coal is subjected. If the heat is gradually raised, a very clear oil first passes over, at a comparatively low temperature, then darker colored oils, then thick tar. On the other hand, if the coal is subjected at once to a low red heat, most of the matter that would otherwise have passed off as oil and tar is converted into gas, and all these products are different in their chemical characteristics. A full cherry red heat is that at which coal in a retort is treated to obtain the best illuminating gas. If the heat is raised much above this, a greater quantity but an inferior quality of gas results. The manufacture of a heavy oil and tar from distilled coal, was conducted by Lord Dundonald, in Scotland, about 1768, long before gas was made for public illumination. The tar was employed for coating the bottoms of ships, to prevent the attacks of the ship worm, before copper sheathing was generally applied. In the spirit with which the manufacture of tar was pursued, Lord Dundonald narrowly missed producing coal oil for commercial purposes, although he used a retort similar to some that were employed within the last four years for distilling coal in making kerosene.

One of the most remarkable products of distilled coal, peat, &c., is parafine, which was discovered by the German chemist Reichenbach, about 1833, as one of the products of tar. It is a white substance, resembling wax in some of its features. This chemist also obtained oil, which he called eupion, from tar. About the same time that parafine was thus obtained from coal tar, Dr. Christison, of Edinburgh, also produced it from Rangoon petroleum, and called it petroline. From this petroleum he also distilled several oils, such as those which are now in common use for illumination. Prior to 1860, the distillation of coal had been carried on for several years upon a very expensive scale in Europe and America for obtaining illuminating oil; but the great supplies distilled in nature's extensive laboratory, situated in the valley of the Alleghany, have supplanted all the similar products of coal distillation, and the amount exported this year, up to the present time, exceeds fifteen millions of dollars.

A good idea of the varied and remarkable effects of heat upon coal in distillation may be communicated by stating that forty-two different substances have been separated from coal and classified, and the production of some of these engages important branches of industry. Among them are illuminating gas, coke, ammonia, naptha, benzole, heavy oil, parafine, tar, aniline and all those beautiful colors derived from it which are now so common on silk and woolen fabrics. Distillation, and the effects of heat upon various substances, form most interesting and instructive studies to inquirers after scientific knowledge.

BREECH-LOADING RIFLES AT THE NEXT FAIR OF THE AMERICAN INSTITUTE.

We learn from the officers of the American Institute, that a prominent feature at the Fair, this season, will be a general exhibition of breech-loading rifles. An opportunity will be given for a competitive trial of the various kinds manufactured, and a diploma or premium will be awarded to the best gun.

This will doubtless be the most attractive and popular part of the exhibition. We also suggest to the managers to permit a trial, at all ranges, between the best breech-loaders and the best muzzle-loaders, in order to settle the mooted question whether a breech-loading rifle with fixed ammunition carries as accurately as a perfect muzzle-loader. On account of the great convenience of breech-loading rifles, there is no doubt that they will entirely supersede the old-fashioned arm, provided that they carry the bullet with equal precision. But a defect in this particular will more than counterbalance all their other advantages; for, if there is anything that is sure to disgust a sportsman with his rifle, it is to have it send the bullet to a place different from that at which it is aimed. It is also asserted by some that the complication of the breech-loader is fatal to its general introduction in the army. While but few persons are found who object to the employment of this class of weapon as a national arm; there are others who maintain that the delicacy of workmanship unavoidable in a breech-loading rifle, materially detracts from its utility for field or cavalry use. These are disputed points, which we hope to see settled in favor of the breech-loader; and we desire to have the coming tests made thorough and severe. Let us have no holiday decisions; but submit the competing guns to searching scrutiny, at least as thorough as they will undergo in actual service. Let the breech-loader be exposed to a cloud of dust, such as is inevitable in a long day's cavalry ride, and then see whether the closely-fitted joints will work so that the trooper can rely upon his weapon, with perfect confidence that it will not be found unmanageable in the hour of peril. Let moisture have a fair chance at the rifle also, so that the public may know how the parts interchange and play in this condition. Let the gun be thrown rudely to the ground, so that all interested may know to a certainty just how much rough usage a breech-loader can stand;—whether it is a bona-fide weapon, or merely a delicate combination of machinery liable to become deranged at the slightest irregular proceeding. Let us know whether it is, in gunnery, what the spy-glass is in optics; or whether it be like the microscope, which requires previous education to manipulate and understand. These are vital points in the utility of breech-loaders, which we should like to have proved or disproved beyond cavil. The greatest value of a muzzle-loading gun is that it is, under all reasonable circumstances, wholly reliable; and it is of very little importance to a trooper or sharpshooter, when his weapon fails him at a critical time, to know that a number of experts have decided that the arm then in his possession is infallible. We do not propose that unreasonable violence should be offered the weapons; but we are decidedly opposed to the sort of encomiums generally lavished upon arms, which are not at all borne out or justified by their mechanical value, or their subsequent performances.

RECENT AMERICAN PATENTS.

Oil Skimmer.—In boiling fish or other materials for the purpose of extracting the oil, and in heating other substances or liquids for the purpose of evaporation or otherwise, the surface of the liquid is generally covered with scum, and the impurities or dregs precipitate, and occupy the bottom part of the tank or still, the clear good liquid being in the middle. The object of this invention is to draw off the clear liquid from the middle, free from the scum on the top, and from the dregs on the bottom. The invention consists in the employment of a shallow saucer-shaped vessel, provided with one or more floats, and with a pipe leading from its lowest point to the barrel or other vessel which is intended to receive the oil or other liquid; said pipe being sustained by one or more floats in such a manner that the saucer-shaped vessel can be adjusted to float on a level with the surface of the clear liquid, under the scum and above the dregs; the vessel being balanced by the floats attached to it, and the pipe being sustained by the floats which are secured to the same, the clear liquid draining off through said pipe until the saucer-shaped vessel settles down on the dregs at or near the bottom of the still or tank. Address Israel Peck or W. H. H. Glover, the inventors, Southhold, N. Y.

Dredging and Ditching Apparatus.—These improvements are more especially designed to be applied in combination with an apparatus termed a "suction dredging boat," patented May 10, 1863, their object when so applied being to cut, bore, pick, break and tear up all obstructive deposits of mud, sand, clay and other matter from the beds of rivers, harbors docks and other places, or to deepen the same, and to cut and break up turf and earth in swamps and marshes and other places, and reduce all such substances and material to a soft or pulpy or sufficiently diluted condition or get them so mixed with water as to admit of their removal by the pumps of that apparatus; also for cutting ditches and canals, and for forming dikes or embankments and filling up lots and improving swamps and marshes and other low lands, and bringing them to the grade of uplands for cultivation, by depositing upon such swamps, marshes or low lands, the material taken up in cutting the ditches or canals from the adjacent waters. The said improvements may, however, be used in connection with any other kind of boat for the purpose of bringing the matters and substances specified to a condition to be removed by the action of a natural current, or the tide or by any other suitable means: and in some instances the said improvements might be arranged upon a carriage to run upon land, where a stream of water may be obtained to effect or facilitate the carrying away or removal of the material which is loosened by the cutting, boring, packing, breaking, and tearing-up operations. William Atkinson, deceased, late of Brooklyn, N. Y., was the inventor of this improvement; and further informa-

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tion relating to it may be obtained of Charles Atkinson, of Moline, Ill., or Joseph Atkinson, of Newbury, Vt.

Pulley Block.—The ordinary tackle or purchase blocks have their pulleys so arranged that they will turn as freely as possible on their axis, both in raising and lowering articles which are suspended to them. This free turning of the pulleys is of course an advantage in raising the articles, but in lowering them it is a decided disadvantage, as the operators have not sufficient control over the descent of the articles, owing to an insufficiency of friction, and frequently a great deal of time and labor is expended in lowering articles to the desired spot, and also in keeping them in a proper line of ascent. To obviate this difficulty is the object of this invention, which consists in arranging with the pulleys, ratchets, pawls and side flanges, in such a manner that, in lowering suspended articles, the pulleys will be subjected to a requisite degree of friction to give the operator full control over the tackle blocks in lowering the articles. J. J. Doyle, of No. 371 Eighth street, New York, is the inventor of this improvement, half of which has been assigned to C. L. Perkins, of No. 54 Exchange Place, New York.

Valve Chest.—The main obstacle which has heretofore presented itself to the successful use of piston valves for the induction and eduction of steam engines has been the unequal expansion of the cylindrical bearings or seats in which such valves work, which has caused the valves either to bind during a portion of their stroke, or else to fit too loosely during another portion thereof; but for this difficulty, such valves, owing to the simple manner in which they can be "balanced," would have been more generally adopted. The object of this invention is to provide for the equal expansion of the cylindrical bearing or seat throughout its whole length, and to this end it consists in a certain arrangement of a steam jacket surrounding or partly surrounding the whole length of the bearing or seat, and communicating with both ends thereof, in such a manner that the steam will heat the said bearing or seat equally throughout the whole length. T. S. Davis, Jersey City, N. J., is the inventor of this improvement.

Door Lock.—The object of this invention is to combine a bar with a lock in such a manner that the bar, which is at the inner side of the door, may be opened by means of the lock from the outer side of the door, the bar being so arranged as to extend entirely across the door, and serve as a far more secure and efficient fastening than the ordinary lock bolts, and more so than the bars and bolts which are adjusted from the inner side of the door, as the bar in this improvement cannot be raised or operated upon by cutting through the door, but only through the medium of the lock. A. Clabaugh, of Atlanta, Pa., is the inventor of this improvement.

Solar-time Globe.—The object of this invention is to arrange a terrestrial globe in such relation to a dial plate and index, that the culminating time of the sun, and consequently the true solar time and also the clock or mean time, can be observed simultaneously at any moment. The invention consists in the arrangement of a terrestrial globe on a horizontal axis, in combination with a revolving annular dial incircling the globe, and adjustable by means of set screws and with a stationary index or pointer, in such a manner that, by the index, the culminating time of the sun on any part of the globe can be observed, and at the same time the clock or mean time can be read off for a certain location for which the dial has been adjusted. T. R. Timby, of Saratoga Springs, N. Y., is the inventor of this improvement.

Sad-iron and Heater.—This invention relates to an improvement in sad-irons or flat-irons as they are frequently termed, and consists in constructing the side with a shell or case in which a sliding or adjustable heater is placed, arranged in such a manner that the iron may be applied to a coal-oil lamp, made to serve as a draught chimney for the same, and be heated very expeditiously, a cold iron being applied to the lamp as a heated one is removed, an order that the lamp may always be provided with a chimney, and a heated iron be always at command during the process of ironing. O. W. Preston and C. Barry, of Corning, N. Y., are the inventors of this improvement.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING JUNE 30, 1863.

Reported Officially for the Scientific American.

*** Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

39,107.—Device for operating Churns.—Henry C. Addis, Springfield, Ill.:

I claim the combination of the spring, L, and treadle, I, with the rock-shaft, D, weighted pendulum, F, adjustable arm, C, adjustable pivoted dasher-rod, B, and churn, A, all in the manner and for the purpose herein shown and described.

[The object of this invention is to obtain a means whereby reciprocating churns, that is to say, those which are provided with rising and falling dashers, may be operated with greater facility than by the ordinary application of the hands to the dash-rod.]

39,108.—Potato Digger.—Theodore Baker, Stillwater, N. Y. Ante-dated July 2, 1862:

I claim the arrangement of the flaring bars, E, and the spiral arms, L, attached to the shaft, F, constructed and operated as and for the purpose specified.

39,109.—Metallic Cartridge.—William Bakewell, Pittsburgh, Pa.:

I claim the use of metallic cartridges so constructed that that portion of the case which enters the charge chamber or breech of the fire-arm (whether tapering or having its sides parallel to its axis), shall be of such shape that a cross section at right angles to its axis will be an ellipse, triangle, square, or other curved or polygonal figure, the perimeter of which will be less than the circumference of a circumscribed circle, so that the cartridge fitting closely in the charge chamber when the piece is loaded, shall, by the expansive force of the discharge, have its longest diameter reduced sufficiently to loosen it when the piece is fired, substantially as herein before described.

39,110.—Shingle Machine.—Joseph Beaudreau, Fond du Lac, Wis.:

I claim, first, The endless chain carriage constructed of segment formed links, h1 h2, cross-bars or ties, h3, the latter at each end, projecting beyond the links, and forming guides, h4, which travel in ways m, and thereby support the bolts, as they are successively fed to the saw, in a proper position to have a shingle cut from the underside of each bolt; in combination with the tilting table, n, and horizontally revolving circular saw, c, when the whole is arranged to operate in the manner and for the purpose specified.

Second, The tilting table, n, and triangular shaft, n4, in combination with the spring, s, and arm, n6, or their equivalents; when arranged to operate in the manner and for the purpose specified.

Third, The pins, a, projecting from the under side of the endless chain carriage, in combination with the gear or toothed wheel, n5, and triangular shaft, n4, when arranged to operate in the manner and for the purpose specified.

Fourth, The worm or screw, d′, and helical spring, d2, in combination with the beveled toothed cog-wheel, c, and shaft, f, when arranged to operate in the manner and for the purpose specified.

[This machine is of that class in which the shingles are cut from bolts by horizontally revolving circular saws, a number of bolts being fed successively to the saws by an endless chain belt. This invention consists in certain novel devices, whereby the machine is made to automatically adjust itself so as to cut the shingles, tip and butt alternately from each side of the bolts. It also consists in a novel device whereby the saws are protected against injury when brought in contact with a hard or knotty place in the bolt.]

39,111.—Composition for sealing Preserve Jars.—Jesse Beckley, Cincinnati, Ohio:

I claim the composition for sealing preserve jars, composed and compounded as set forth.

39,112.—Projectile for Rifled Ordnance.—Alfred Berney, Jersey City:

I claim the combination with the polygonal extension, b, of the depression, a a, notches, d d, and the hollow conical packing ring, B, formed with a shoulder, e, all the parts being constructed, arranged, and combined to operate together in the manner herein shown and described.

[The object of this invention is to obtain a simple mode of combining a packing ring with an elongated projectile which shall both compel it both to transmit to the projectile the rotary motion which it acquires in passing along the rifle grooves of the gun, and to remain securely attached to the projectile during the flight of the latter. It has been proposed to combine the ring with the projectile by constructing the interior of the ring of polygonal form and constructing the projectile with a polygonal projection on its base to fit the so-constructed ring but while this may have provided for the rotary motion of the projectile it has afforded no adequate provision for preventing the ring from flying off after the discharge of the projectile from the gun. This invention consists in making the front portion or portions of one or more of the sides of such polygonal projection with inward inclination, giving the said projection the character of a dove-tail by which the ring is prevented from flying off; also in providing notches or recesses in the shoulder formed upon the projectile in front of the said projection, into which portions of the ring may be driven by the action of the gases diminated by the firing of the charge of the gun and thereby made to aid the ring in transmitting rotary motion to the projectile.]

39,113.—Machine for cutting Thin Timber.—Benjamin F. Betts, Tonawanda, N. Y.:

I claim the combination and arrangement of the sliding box with oblique motion, thereby giving by movement of the block a drawing cut to the knife, in combination with the diagonal position of the knife attached to the immovable bed-plate; and the arrangement of eccentrics for elevating or depressing the movable bed-plate.

39,114.—Instrument for indicating the Depth of Water in Cisterns.—H. L. Brevoor, Brooklyn, N. Y.:

I claim the arrangement of the flexible diaphragms, b b b′, to form an expanding chamber within the box, A, and in combination with a spring, i, substantially as herein specified.

[This invention relates to instruments for indicating the depth of the bilge water in a ship or other vessel, or of the water in a tank or other reservoir by the agency of the pressure of the column of such water acting through the medium of air. In carrying out the invention there is used a series of flexible, sectional, or annular diaphragms such as are used in the bilge and leakage indicator which constitutes the subject matter of setters.]

39,115.—Tea Pot.—Alexander M. Bristol, Detroit, Mich.:

I claim as an improved article of manufacture a tea-pot and water-urn, arranged and combined in the manner substantially as set forth.

[This invention consists in having a vessel composed of two separate compartments, one for tea and the other for hot water, and having each compartment provided with a spout, whereby both tea and hot water may be obtained from the same vessel and the tea kept at a proper warm temperature by the hot water, which receives its heat from a lamp underneath the vessel.]

39,116.—Mosquito Bar.—Asa L. Carrier, Washington, D. C.:

I claim, first, A portable insect shield so constructed as to be operated from the outside, substantially as described by means of levers, A and B.

Second, Levers, A′, constructed and operating as described, in combination with levers, B.

Third, Levers, B, constructed and operating as described, for the purposes set forth.

Fourth, The clasp, C, constructed and operating as described for the purposes set forth.

Fifth, The braces, D, constructed and operating as described, in combination with tension cords 1 and 2.

39,117.—Lock.—Andrew Clabaugh, Altoona, Pa.:

I claim the disk, C, provided with the spring, g, the slide, D, tumbler, F, and slide, B, all arranged and combined to operate in connection with the bolt, H, as and for the purpose specified.

I further claim the semi-circular slide or guard, K, when combined and arranged with the disk, C, slide, D, tumbler, F, and slide, B, for the purpose specified.

39,118.—Mole Plow.—Stillman A. Clemens, Rockford, Ill.:

I claim, first, The mole, a, attached near its forward end by a pivot pin near to the front edge of the lower end of a cutter bar, b, substantially as described and for the purposes specified.

Second, A cutter bar, b, attached to a mole plow beam, h, by the herein described or an equivalent mode which allows free pendulous and hinge movements to the cutter-bar, substantially as described and for the specified purposes.

39,119.—Machine for preparing Tow from Tangled Flax Straw.—George F. Clemons, Springfield, Mass.:

I claim, first, The breaking rollers, K, cylinder, H, constructed with concave ends, j, and having holes, k, made in it as shown and provided with teeth, h, and wings, i, and the open endless apron, J, when all are combined and arranged to operate as and for the purpose herein set forth.

Second, The side-pieces or strips, g g, placed over the endless apron, F, for the purpose of reducing the width of the same, when said side strips or pieces are used in connection or combination with the cylinders, D, H, concaves, E I, breaking rollers, C C′ K, and endless apron, J, for the purpose herein set forth.

[This invention consists in a combination and arrangement of breaking rollers, toothed cylinders and concaves, and discharging and feed aprons, one of the toothed cylinders being so constructed as to serve as a fan or blower, whereby the desired work, to-wit the preparing of tow from tangled flax, may be accomplished in a rapid and thorough manner.]

39,120.—Breech-loading Fire-arm.—John Webster Cochran, New York City:

I claim, first, The safety guard or guide, i, in connection with the recoil block, b, as set forth.

Second, I claim the arm, j, attached to the hammer, f, for throwing it back to half-cock by coming in contact with another lever or spring, j′, when opening the breech by throwing the recoil block down as described.

39,121.—Hooks and Eyes for Connecting Cords.—Abiel Codding, Jr., North Attleboro', Mass.:

I claim the improved socketed hook and eye, having the socket tubes, a, thereof provided with serrations, teeth, or prongs, arranged in the manner and for the purpose as specified.

39,122.—Seed Planter.—Edward Cox, Point Pleasant, Ohio:

I claim the arrangement of the slide, H, and spring, J, with the pulleys, E G, belt, I, seed cups, h, concave, F, box, D, spout, K, gate, M, and seed hopper, L, all in the manner herein shown and described.

[This invention consists in a novel seed-distributing device composed of an elevator formed of cups attached to an endless band or chain having a tension spring connected with it in such a manner that the belt or chain will always be kept in a proper state and made to operate perfectly.]

39,123.—Locomotive Boiler.—Benjamin Crawford, Pittsburgh, Pa.:

I claim, first, The arrangement of the super-heating tubes, c c, in line with the flues, a a, when the chamber which contains the tubes, c c, is constructed with a vertical diaphragm, g, and the whole enclosed by the case, E, of the boiler, substantially as and for the purpose set forth.

Second, The combination of heads, d d′, flues, c c, steam pipes, D G, and diaphragm, g, arranged and operating substantially as herein described and for the purpose set forth.

39,124.—Plumb, Level and Square.—D. G. Davison, E. Pullen, Prospect Plains, N. J., and J. S. Davison, Cranberry, N. J.:

We claim the mode of combining a plumb, level and square together, by means of forming that part of the square wherein the plumb is hung hollow or like a case, with an opening on either side at the lower part so that the plumb can be easily seen and brought to an exact perpendicular by means of marks or other indications as above set forth and as shown in the various figures, or when the aforesaid combination is attained by other means, substantially the same as those herein arranged and described.

39,125.—Valve Chest for Steam Engines.—Thomas S. Davis, Jersey City, N. J.:

I claim the arrangement of the open-ended valve cylinder, B, within the casing, A, in such manner that a steam jacket or space, a, is formed between them, which surrounds or nearly surrounds the whole length of the said cylinder and which communicates with the said cylinder at the ends thereof, for the induction of the steam thereinto, substantially as and for the purposes herein specified.

39,126.—Corset.—Horace H. Dayton, Worcester, Mass.:

I claim a corset combining the adjustable shoulder-straps, D, body. A, and extensor, J, or the equivalent thereof, substantially as shown and described.

39,127.—Cooking Stove.—William S. Deisher, Hamburg, Pa.:

I claim, first, The flues, H H, provided with openings, H′ and i, in combination with the air-heating space, J, and flue, L, when arranged in the manner and for the purposes specified.

Second, The combination of the flues, H and L, with the openings, b and s′, valves, M S, and oven, C, when arranged in the manner and for the purpose specified.

[This invention consists in a novel arrangement of passages or flues in a cooking stove, whereby, without detracting in the least from the efficiency of the stove for cooking purposes, a large amount of heating surface is obtained which may be used for heating air and this air used for warming the apartments of the building in which the stove is placed.]

39,128.—Hay Elevator.—James M. Dick, Buffalo, N. Y.:

I claim, first, The employment of the screw, B, in the manner and for the purpose herein described and set forth.

Second, I claim the bolt, D, in combination with the flange, E, and screw, B, when used for the purpose herein specified.

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Third, I claim the hook, L, in combination with the handle, A, and screw, B, when used as herein set forth.

39,129.—Coal Oil Heater.—H. W. Dopp, Buffalo, N. Y.:

I claim, first, The adjustable small disk, a, in combination with the perforated distributing plate, A, for the purpose as set forth.

Second, I claim the mode of vaporizing coal oil of any gravity, or other hydro-carbon liquids for heating and cooking purposes, by means of a retort without wicking or packing of any kind or form, so arranged that the supply of oil enters into the retort below the point of vaporization as described.

Third, I claim the combination of retort, C, and draw-off valve, H, for the purpose described.

39,130.—Tackle or Purchase Block.—John James Doyle, New York City:

I claim the employment or use in tackle blocks of ratchets, E, and pawls, F, arranged and combined with pulleys, D, and either with or without the flanges, G, to operate as herein set forth.

39,131.—Spring Catch for Lamps.—Daniel A. Draper, East Cambridge, Mass,:

I claim the construction of the spring catch, and its application or arrangement, relatively to the deflector holder and the wick-tube, the whole being substantially as above described.

39,132.—Clod-crusher and Harrow.—George W. Dubuisson, Jerusalem South, N. Y.:

I claim the combination of the clod-crusher, A, and harrow, C, connected by hinges or joints, D, and arranged substantially as herein shown and described.

39,133.—Riding Stirrup and Hood.—Robert Nelson Eagle, Washington, D. C.:

I claim, first, A stirrup frame of wood bent as described, with arms close together at their upper ends in combination with a cap strap or band, applied to the inside or outside or both inside and outside of the frame to sustain the means of suspension, substantially as set forth.

Second, A toe-piece or hood of leather or analagous material, stamped or prepared by dies in proper form, adapted to fit within or on the outside of the frame, or partially within and partially on the outside, substantially as set forth.

[This is an improvement on the army stirrup in common use. By the improvement an article is produced possessing much greater strength and durability, and an improved appearance at a reduced cost.]

39,134.—Egg-beater.—Timothy Earle, Smithfield, R. I.:

I claim the use of a series of cutting edges, a a a a, when attached to a frame, A, which is capable of being rotated, substantially as described for the purposes specified.

39,135.—Manufacture of Alkaline Silicates.—Thomas Elkinton, Philadelphia, Pa.:

I claim manufacturing silicate of soda by permitting a supply of the ingredients of which it is composed to fall on to the bed of a furnace, down which as well as down other beds if required, the fused silicate flows in a continuous stream to the outlet opening, and while taking its course is subjected to the direct heat of the furnace as described.

39,136.—Breech loading Fire-arm.—William H. Elliott, Plattsburgh, N. Y. Ante-dated Jan., 23, 1863:

I claim, first, The use of the sliding breech, d, lever, h, and link, g, when these devices are arranged and employed substantially as herein specified in relation to each other, and to the rest of the arm.

Second, The use of the sliding breech, d, lever, h, and link, g, when these devices are arranged and employed substantially as specified in relation to each other, and when the sliding breech moves back and forward upon shoulders or guides which are so curved as to conform to the shape of the arm, as set forth.

39,137.—Braiding Machine.—Henry Fletcher, Providence, R. I.:

I claim the combination of the switch cam, C, of the racer with one or more pins, D D, or the equivalent thereof, raised on the race plate, the same being arranged so as to operate substantially in the manner and for the purpose as herein before specified.

39,138.—Braiding Machine.—Joseph Fletcher, Providence, R. I.:

I claim an improvement in the braiding machine, the same consisting in having the racers and driving wheels or gears and the supports of the racer so constructed, that the weight of the racer shall be borne on each of the said driving gears, while in the act of being driven by such gears.

And I also claim the combination of the recessed plate, D, or its equivalent, with the racer base, b, and the driving wheel or gear, C, on which such plate is affixed, such plate being for the purpose, and to operate in manner substantially as herein before explained.

39,139.—Fabric for Roofing.—Joseph J. Fuller, Brooklyn, N. Y.:

I claim preparing sheets of roofing paper, with the water-proofing compound set forth in the manner specified.

39,140.—Ventilating Railroad Cars.—Charles Dana Gibson, New York City:

I claim the arrangement of a shaft, C, provided with right-and-left-handed screw-wheels, N and M, in the water-tank of a locomotive tender, above the level of the water, in combination with suitable openings in the sides of the tender, and with an escape pipe, P, on the top of the tender, and operated in the manner and for the purpose as described and set forth.

39,141.—Wringing Machine.—Heman Glass, Honeoye Falls, N. Y.:

I claim the standards, A A, provided with the straight and bevelled opening, c c, the curved clamp, G, connected with the cross support, b, by the guide pins, g g, and elastic strips, h h, and the tightening screws, i i, the whole arranged, combined and operating substantially as and for the purpose herein set forth.

39,142.—Beehive.—John A. Gruver, West Union, Iowa:

I claim a bee-house or bee-palace provided at its sides with horizontal shelves, e e, and flaps or doors, E, to receive the spare honey boxes, I, and also provided with horizontal internal ledges, d, to support the hives, a door, D, at each end, and an inverted pyramidal lower part, a, with a flap, H; the house or palace being supported by a suitable framing, A, all constructed and arranged as and for the purpose set forth.

39,143.—Hame-tug.—Levi Hall, Henrietta, Mich.:

I claim, first, By making hame-tugs for harnesses in two separate parts except the forward end where the hame rivets on, so as to admit the trace between the two pieces of the hame-tug.

Second, By fastening the trace to the hame-tug by two bolts or thumb-screws, in the manner herein described and represented by the drawings.

39,144.—Shoe Fastening.—E. C. Harrington, Fair Plains, Mich.:

I claim the elastic detachable bands, D, as applied to the shoe substantially as described.

39,145.—Balance.—Sandy Harris, Philadelphia, Pa.:

I claim the manner, mode and means, substantially as set forth and described, of arranging, moving, and denoting the movements of the weight to and from the fulcrum or knife-heads, for weighing purposes, or for testing the pressure of steam, and whether used in this or any other form of balance.

39,146.—Grain Separator and Cleaner.—David W. Harshbarger, Myersburgh, Pa.:

I claim the arrangement and combination of the concave and convex hulling stones, I I', spindle, G, adjusting beam, L, cam-wheel, d, rock lever, D, vibrating screen, C, and conveyer, H, in such a manner that the grain is screened and conveyed to the stones, and said stones are adjusted without affecting the action of the screen, substantially as herein set forth.

I also claim the fan beater, N, revolving in the chamber, M, the perforated bottom, m, compartments, n o p, and the auxiliary exhaust fan, P, the two fan chambers being connected by the passages, q r, the whole arranged, combined, and operating substantially as and for the purposes specified.

I also claim the specific arrangement of the whole machine, whereby a draft is produced between the stones and through the grain, from the time of its ingress to its exit, substantially as herein described.

39,147.—Device for preserving Postage Stamps.—James P. Herron, Washington, D. C.:

I claim to preserve postage stamps, &c., after being damp or wet from adhering and drying together or to surfaces injuring them or rendering them useless, as specified and set forth.

39,148.—Bill and Currency Holder.—George B. Isham, Burlington, Vt.:

I claim the arrangement of the trap doors, B, provided with cross-shaped projections, k, in combination with slots, l, in the rear walls of the several compartments of the tray, A, constructed and operating as and for the purpose herein shown and described.

And I also claim the arrangement of the hooks, m, on the front walls of the several compartments in combination with springs, m, and with the handles, j, of the trap doors, B, constructed and operating in the manner and for the purpose substantially as specified.

[The object of this invention is a compact, simple and cheap device for holding in different compartments and separate from each other letters, bills and currency of the various denominations in such a position, that such bills or letters can be readily put in or taken out either singly or in quantities of two or more and that the same when put in, are held in place by suitable weights and protected against being blown off. An engraving and description of this invention has been published in No. 29, Vol. VIII., of the Scientific American.]

39,149.—Skate.—Luman F. Johnson, Buffalo, N. Y.:

I claim, first, The application and use of a lifting screw shaft, F, placed between the skate runner and wood for the purposes and substantially as set forth.

Second, I also claim the metal disk, C, having an undercut dove-tail notch in combination with a runner bent at both ends and fitted in said notch, as a means of fastening the runner to the wood, substantially as described.

39,150.—Combined Knapsack, Tent and Litter.—Louis Joubert, Paris, France:

I claim the arrangement of the knapsack, A, with straps, h h' k k', poles, E E', cross-bars, F, with hinged legs, e, straps, f, and canvas, D, all combined and operating in the manner and for the purpose substantially as herein shown and described.

[The object of this invention is to combine all the elements necessary to make a litter or one-half of a tent with a knapsack, in such a manner that the same can be conveniently carried by a soldier, giving him the opportunity to provide the means for carrying a wounded or sick comrade from the battle-field, or to shelter himself against the sudden changes of the weather.]

39,151.—Bit Stock.—Samuel U. King, Windsor, Vt.:

I claim the improved bit-stock, as having the shank and handle pivoted together as described, and combined with a chambered sleeve made and applied to both in manner and so as to operate therewith substantially as specified.

39,152.—Carpet Bag Frame.—Samuel Lagowitz, Newark, N. J.:

I claim having the cover, B, made of elastic wood and attached to one of the wooden jaws, A, by stays, all as herein shown and described.

[This invention consists in a frame for carpet bags made of wood in such a manner that a cheaper frame is produced than the ordinary iron frame, and a frame which is less liable to get out of order, which is stronger, more durable, easier to transport and easier to manufacture.]

39,153.—Lamp Wick.—E. B. Larcher, New York City:

I claim for the wicks of lamps, the holder containing asbestus, substantially as described, in combination with common wicking extending down into the reservoir of the lamp, substantially as and for the purpose specified.

39,154.—Lamp.—A. B. Latta, Cincinnati, Ohio:

First, I claim the connection of a common burner with the inverted metallic chimney, C, by means of solder, so as, when used with a single metallic cone, to make a conductor of heat from the flame to the air inside the chimney, thereby rarefying the air and producing an upward current therein.

Second, I also claim the combination of the inverted chimney, C, with the oil chamber, G, when used with a single metallic cone, so as to direct the current of air passing between the inverted chimney, C, and the oil chamber, G, against the flame on all sides, thereby sustaining the flame without the aid of a glass chimney or other appliances.

39,155.—Sap Spile.—J. M. Le Count, Hartford, Wis., and G. R. Boynton, Chicago, Ill.:

We claim, first, A machine for forming sap spiles from sheet metal, when constructed in a similar manner and for the purposes herein described.

Second, We claim the combination of the several parts of said machine, when constructed in like manner and for the purposes hereinbefore described.

39,156.—Boot and Shoe.—G. W. Ludlow, Elizabeth, N. J.:

I claim the application of a spring, b, to the back seam of a boot or shoe, in the manner and for the purpose substantially as shown and described.

[An engraving and description of this invention was published in No. 24, Vol. IX. (new series), Scientific American.]

39,157.—Oil Can.—John Mayher, East Hampton, Mass.:

I claim, first, Taking the air in at the bottom of the can, A, instead of at the top, as specified.

Second, The arrangement of the conical reservoir, D, with the tube, F, in combination with the air tube, E, extending up through the bottom of the can, A, as and for the purpose shown and described.

[This invention consists in the arrangement of an air passage extending from the bottom of an oil can up near to its top, in such a manner that free access to said passage can be had at all times without taking the oil can to pieces, and that the same can be prevented from stopping up; the invention consists also in the arrangement of a reservoir on the inside of the bottom of the can and surrounding the air tube leading through the bottom, in combination with a tube extending from the top of the reservoir to the top of the can, in such a manner that the oil which may find its way into the upper tube collects at the bottom of the reservoir, and is not permitted to leak out at the bottom of the can through the air passage.]

39,158.—Baling Press.—D. L. Miller, Madison, N. J.:

First, I claim the ropes or chains, C, and the cones, G G, on the shafts, F F, in combination with the driving shaft, J, worm wheels, H H, and screws, I I, all arranged substantially as and for the purpose herein set forth.

Second, Having the driving shaft, J, fitted in rods, K K, which are connected to cranks on a shaft, L, substantially as shown, for the purpose of throwing the screws, I I, in and out of gear with the wheels, H H, as herein specified.

[This invention consists in operating the follower of the press by means of right and left screws formed on a driving shaft and gearing in worm wheels which are fitted on shafts placed at the ends of the press box, said shafts being provided with conical pulleys to receive the chains or ropes which draw up the follower, and the driving shaft being fitted in adjustable bearings, all being arranged in such a manner as to admit of the desired work being rapidly done and in an efficient and proper manner.]

39,159.—Gas Apparatus for Domestic Use.—Wm. Mills, and O. H. Burdett, New Athens, Ohio:

We claim, first, The arrangement of the concaves, E, or their equivalent, forming a zig-zag or winding passage in the interior of the purifier, constructed and operating in the manner and for the purpose substantially as described.

Second, The arrangement of a lime chamber in the movable lid, F, of the purifier in combination with the flexible tube, I, constructed and operating as and for the purposes set forth.

[The object of this invention is to produce a gas apparatus capable of supplying a dwelltng house with gas, and so simple and cheap in its construction and operation that it can readily be put up and operated in every house.]

39,160.—Folding Guide for Sewing Machines.—John Morrison, Birmingham, England. Patented in England Sept. 30, 1858:

I claim the improvement in or addition to sewing machines hereinbefore described and illustrated in the accompanying drawing, that is to say, an instrument or apparatus constructed and operating as herein described, so as to regulate the width of the fold, and to be attached to or used in connection with sewing machines, for the purpose of folding or doubling the edge or edges of the fabric or material to be sewed, substantially as herein described, the said instrument or apparatus consisting essentially of the two guiding plates, h i, and of two plates or strips, a b, of sheet metal or one plate folded, as herein described and the levers, n or 1; the said plates or strips, h i, being situated parallel or nearly so to one another, and the said plates or strips, a b, being twisted into a screw-like form and either or both grooved or plain on their inner or opposed surfaces.

39,161.—Automatic Sounding Apparatus.—H. M. Naglee, U.S.A., San Francisco, Cal.:

I claim the within-described self-sounding apparatus composed of a rod or its equivalent hung to the side of the vessel and permitted to traverse the bed of the river or harbor, substantially as set forth, for the purpose specified.

39,162.—Apparatus for detecting and exploding Submarine Torpedoes.—H. M. Naglee, U.S.A., San Francisco, Cal.:

I claim, first, Searching for and exploding torpedoes by means of a raft, A, or other suitable object permitted to float with the tide or current from a vessel at anchor, and having the appliances herein described or their equivalent, to be operated from the deck of the said vessel, the said appliances being such as to cut or to catch, seize or become entangled with the discharging cords of the torpedoes, as herein set forth.

Second, The lever, B, its plates, H, and pawls, i, or other similar appliances, the whole being attached to the raft, A, or other floating object, and the lever being controlled by a cord or rope, G, communicating with the vessel, M, all substantially as set forth for the purpose specified.

39,163.—Mode of lacing Boots.—Robert Newton, Philadelphia, Pa.:

I claim securing boots and shoes by laces passing through holes in the legand through a tongue, when the latter is formed and arranged in respect to the boot or shoe, as described for the purpose specified.

39,164.—Guide for Scroll Saws.—George Niderkorn and John Dubernet, New York City:

We claim the arrangement of the horizontal adjustable slotted guide, g, in the box, e, attached to the vertically-adjustable square rod, c, in combination with the endless band saw, A, constructed and operating in the manner and for the purpose herein shown and described.

[This invention relates to an improvement in that class of scroll saws in which the saw blade forms an endless band stretched over two pulleys to which a rapid rotary motion is imparted by steam or other suitable power.]

39,165.—Bridle Bit.—J. H. J. O'Neill, New Haven, Conn. Ante-dated May 15, 1863:

First, I claim the open adjusting rings described, when the same are used in combination with the bridle bits, in the manner and for the purposes substantially as herein set forth.

Second, I claim the combination and arrangement described of the bar, B, gag, A, thimbles, N N, and levers, P P, constructed and operating substantially in the manner and for the purpose as herein set forth and described.

39,166.—Apparatus for pasting and mounting Photographs, &c.—M. Ormsbee, New York City:

I claim, first, Covering the pasting and rolling-down or pressing rollers with rubber or its equivalent, substantially as and for the purpose described.

I also claim the arranging of the pasting and pressing-down rollers, in different planes with regard to the handle, substantially as described.

I also claim the combination of the paste reservoir, pasting and pressing rolls, frame and handle, for the purpose of pasting and pressing or rubbing down with one instrument, substantially as described.

39,167.—Balancing and ventilating Mill-stones.—S. N. Page, Salona, Pa.:

I claim, first, The weights, F, provided with set screws, c, and fitted to slide on a circular way, E, which is supported in a position concentric with the stone by flanches or wings, b, projecting from the circumference of the same, as and for the purpose specified.

Second, The flanches or wings, b, projecting from the runner stone in combination with the inclined partition, J, box, I, fender, k, and opening j, when constructed and arranged to operate in the manner and for the purpose specified.

[The nature of this invention consists in providing the runner stone with a number of weights capable of being adjusted so as to balance the stone and cause its face, as it rotates, to preserve its exact parallelism with the face of the bed stone. It also consists in a novel device for oscillating the "run of stone."]

39,168.—Furnace.—Bernard Palazot, Bordeaux, France:

I claim the improved combination of the vaulting or plate, C, with the air entry, A, and register, B, applied to boiler and other furnaces, the whole constructed and arranged in manner and for the purpose substantially as herein specified and shown in the figures of the annexed drawing.

39,169.—Device for drawing-off and skimming Oils, &c. Israel Peck, Southhold, N. Y., and W. H. H. Glover, New York City:

We claim the combination of the floats, B B B D, with the saucer, A, and pipe, C, substantially in the manner and for the purpose herein shown and described.

39,170.—Traveling Kitchen.—Morris Pinner, New York City:

I claim the construction of a locomotive cooking apparatus by connecting a steam generator or cooking range, boilers and steam pipes with movable frames, constructed substantially as above set forth, which frames contain and hold the boilers in place, while the vehicle containing the whole apparatus is in motion.

39,171.—Sad-iron.—O. W. Preston, Jr., and Charles Barry, Corning, N. Y.:

We claim the iron, D, composed of a shell, c, and a sliding or adjustable heater, f, fitted within it and arranged substantially as shown so as to serve while being heated as a draught chimney for the lamp, as set forth.

39,172.—Steam Trap.—W. L. Ray, North Adams, Mass.:

I claim the plunger or valve, E, weight, G', and stop, J, combined with each other and with the expanding pipe, B, and box, A, or its equivalent, to operate substantially as and for the purpose herein specified.

[This invention consists in a novel mode of combining a valve, a weight, expanding pipe and a stop, in a steam trap, whereby it is rendered very simple and durable and of very certain operation.]

39,173.—Chuck for turning Staves.—Francis Robbins, Acton, Mass.:

I claim the heads, F and G, in combination with the shaft, C, and nuts, b, or their equivalents, arranged and operating in the manner substantially as set forth for the purpose specified.

39,174.—Improvement in the Quality and Ornamentation of Metals.—William Rose, Halesowen, England. Patented in England August 31, 1858:

I claim for the purposes of ornamentation and strength, the piling or combining of metals into a billet, so that the lamina of the metal of some of the bars shall be at right angles to that of some of the other bars in the pile, for the purpose of giving the mass, when worked, a checkered appearance throughout, as herein more fully set forth and specified.

39,175.—Life Preserver.—Socrates Scholfield, Norwich, Conn.:

I claim the combination of a floating valve, F, with the pipe, B, or its equivalent, substantially as described.

I also claim the combination of a floating valve, F, with the pipes, C C', or their equivalent, substantially as described.

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39,176.—Condenser for Steam Engines.—T. E. Sickels, Kennett Square, Pa. :

I claim the combination and arrangement in a condensing steam engine of an air pump and surface condenser with a blower to force a current of air through the condenser to effect the condensation of the steam and to heat the air, substantially as set forth.

39,177.—Attaching Hubs to Wagons.—A. E. Smith, Bronxville, N. Y. :

I claim the use of the ledge, M, formed on the inside of the screw cap, L, in combination with the revolving linch pin, K, and axle, A, for the purpose hereinbefore set forth.

39,178.—Hand-stamping Press.—S. J. Smith, New York City :

I claim, first, The combination of a swinging stamp with the inking table and impression bed, when said inking table is elevated above the impression bed for the purposes specified.

Second, I claim two arms swinging on one gudgeon and carrying different stamps, substantially as specified, in combination with inking and impression tables, so placed that either stamp can be inked and impressed, as set forth.

Third, I claim the adjustable inking table, l, formed as a shallow-flat cup setting upon the arm, c, as and for the purposes specified.

Fourth, I claim the shallow cup and cloth pad, forming the inking table, in combination with a stamp fitted upon an arm and gudgeon to swing from such inking cup to the impression table, as set forth.

39,179.—Sabot for Projectiles.—C. W. Stafford, Burlington, Iowa :

I claim, first, A sabot constructed with a conical shell, C, to form an abutment between the disk, A, and the rear of a spherical or other shot.

Second, A sabot constructed with a disk, A, flange, B, conical disk, C, rings, E E′ E″ E‴, and band, G, substantially as described, for use in connection with a sub-caliber shot or shell.

[The objects of this invention are to reduce the strain upon the gun and improve the accuracy and range of the shot. The sabot is adapted to receive the full force of the explosion on an area larger than that of the shot, guide the latter in an accurately central position through the bore and separate from it at the instant of leaving the gun.]

39,180.—Projectile.—C. W. Stafford, Burlington, Iowa :

I claim, first, An elongated shot, A, guided and supported within the bore by a hollow spheroidal band, C, which may continue with it in its flight, and by a sabot, D, which, after receiving the full explosive force of the charge will separate from the shot by atmospheric resistance, substantially as explained.

Second, The detachable conical-faced sabot, D, and expansible packing disk or cup, E, constructed as described, in combination with the sub-caliber bolt, A, for the purposes specified.

[The leading objects of this invention are to impart accuracy, range and high velocity to a sub caliber projectile for the purpose of penetrating opposing bodies, mail-clad or otherwise, and destroying them by explosive or incendiary agents]

39,181.—Slide Valve for Steam Engines.—A. J. Stevens, San Francisco, Cal. Ante-dated April 29, 1863 :

I claim, first, The connected puppet valves, g g′, applied in combination with separate chambers, e e′, and in relation to the main valve, substantially as and for the purpose herein specified.

Second, The follower, C, combined with the valve by means of an internal gland, E, and otherwise applied, as herein specified, to serve not only for the protection of the back of the valve from the pressure of steam but as a means of communication between the anti-compression valve chest and the exhaust pipe or atmosphere, as herein set forth.

39,182.—Sugar Cane-crushing Mill.—Isaac Straub, Cincinnati, Ohio :

I claim the arrangement of projections, G G′, on the under side of the top plate, A, and on the upper side of the bottom plate, A′, and so that the ends of the rollers for only a small portion of their extent, and immediately at the point where the crushing is performed, shall abut against them, all substantially in the manner and for the purpose described.

39,183.—Solar-time Globe.—Theodore R. Timby, Saratoga Springs, N. Y. :

I claim the arrangement of the toothed ring, D, and adjustable dial, C, revolving once in twenty-four hours, in combination with the globe, A, secured to the revolving ring and adjustable in the same and with the stationary index, F, all constructed and operating in the manner and for the purpose substantially as shown and described.

39,184.—Currency and Stamp Box.—L. L. Tower, Cambridgeport, Mass. :

I claim my combined stamp and currency box, having its parts, A and B, provided respectively with receptacles and retainers, constructed and arranged substantially in the manner and for the purposes set forth.

39,185.—Composition for Lubricating.—James Turner, New York City :

I claim a lubricating compound made of the ingredients herein specified, mixed together in the manner and about in the proportion set forth.

Also, the use of sawdust in combination with fatty substances and alkaline lye or lime water, as and for the purpose specified.

[This invention consists in mixing together paraffine or the heavy oil contained in petroleum and saponified red oil or the residuum from the fat, or other material used in the manufacture of candles, with lime water or other alkaline lye, and sawdust, in such a manner that by the sawdust the lubricating qualities of the fats are retained and a compound is produced which can be used with great advantage and economy for lubricating axles and heavy gearing.]

39,186.—Harvester.—Thomas and Israel W. Ward, Lane Depot, Ill. :

We claim the two frames, A I, connected together by the hinges or joints, d, as shown, in connection with the draught bar, D, connected at its front end to the frame, A, by hinges or joints, b b, the two frames having arms, U Y, attached to them, which are connected by cords, V Z, to the shaft, X, and tube, W, all arranged substantially as and for the purpose specified.

We further claim the tubular joints or pintles, d, for connecting the two frames, A I, in combination, with the pitman, J, for driving the sickle, K, when arranged as shown, to admit of the adjustment of the two frames without interfering with the sickle-driving mechanism.

[This invention consists in a novel and useful combination of two frames and a draught bar, arranged in such a manner that the sickle and platform may be raised and lowered to any desired length, according to the length of cut required, and the sickle always kept in a proper horizontal position, and at the same time a very simple, economical and efficient harvester obtained.]

39,187.—Carding Engine.—John C. Whitin, Northbridge, Mass. :

I claim combining the self-stripper of Wellman with the cylinder stripper of Gambrill and Burgee, essentially as above described.

39,188.—Row-lock.—W. H. Willard, Cleveland, Ohio :

I claim the herein-described construction of a row-lock, consisting of the plate, A, thole pins, D, plates, F, and springs, G, the several parts being arranged and operating substantially as and for the purpose specified.

39,189.—Casting Boxes for Carriage Axles.—Samuel Williamson, Cincinnati, Ohio :

I claim the cast-iron flask, H H, gate, A, in combination with the sand core, C, attached to the chill, E, operating in the manner and for the purpose substantially as set forth.

39,190.—Self-lubricating Bolster for Spinning Machines.—M. P. Wilmarth, Smithfield, R. I. :

I claim the arrangement of the cap, C, with the absorbent, E, and annular recess, c, or their equivalents, substantially as described for the purpose specified.

39,191.—Photographic Printing Frame.—Michael Witt, Columbus, Ohio :

I claim the application of the self-adjusting spring-cushion to the two flaps or backs of the frame, arranged and operated for the purpose set forth and shown, or any other arrangement substantially the same for the accomplishment of the same end.

39,192.—Fishing Tackle for Deep-sea Fishing.—William Woodbury, Gloucester, Mass. Ante-dated October 2, 1862 :

I claim introducing the spring, g, or its equivalent, into the length of the fishing line in the neighborhood of the hook, substantially in the manner and for the purpose specified.

39,193.—Centering Anvils.—John Adt (assignor to himself and Elisha Turner), Waterbury, Conn. :

I claim the center punch, b, in combination with the cap, c, blocks, g, and scroll, f, as and for the purpose specified.

39,194.—Dredging and Excavating Machine.—Charles Atkinson, Moline, Ill., and Joseph Atkinson, Newbury, Vt., executors of William Atkinson, deceased, late of Brooklyn, N. Y.:

We claim, first, The employment, in combination with what has been herein termed the suction dredging boat, or with any other boat or carriage, of a system of reciprocating spade cutters, F F, operating substantially as and for the purpose herein specified.

Second, The employment, in combination with the suction dredging boat, or any other boat or carriage, of a system of reciprocating and rotating spade cutters, I, applied to operate substantially as and for the purpose herein set forth.

Third, The employment, in combination with the suction dredging boat, or any other boat, of a system of reciprocating and rotating chisel-pointed cutters, K, applied and operating substantially as and for the purpose herein set forth.

Fourth, The employment, in combination with the suction dredging boat, or other boat or carriage, of a rotary boring tool, L, applied and operating substantially as and for the purpose herein described.

Fifth, The cylindrical casing, M, applied in combination with a screw-like construction of the tool, L′, to form a pump, substantially as herein specified.

Sixth, The employment in combination with the suction dredging boat, or any other boat or carriage, of a rotary boring tool or system of cutters, P′, arranged in a swinging carriage, Q, substantially as and for the purpose herein specified.

Seventh, The employment, in combination with the suction dredging boat, or any other boat or carriage, of a cutter cylinder carrying a series of cutters, S S, and operating substantially as and for the purpose herein specified.

Eighth, The employment, in combination with the suction dredging boat, or any other boat or carriage, of a chopping, cutting or raking blade, X, applied and operating substantially as and for the purpose herein set forth.

39,195.—Coal-oil Lamp.—Louis Bader (assignor to himself and C. F. Elwert), Philadelphia, Pa. :

I claim the burner composed of cases inclosing chambers, J K L and M, arranged in respect to each other and to the wick, and communicating with each other, substantially as described for the purpose specified.

39,196.—Machine for manufacturing Lozenges.—Oliver R. Chase, Birmingham, England, assignor to Chase & Company, Boston, Mass. :

I claim the combination and arrangement of the extra-delivery apron, G, with the main-delivery apron, F, or carrier of the reducing and sugaring apparatus, and with mechanism for stamping the lozenges from the paste, the object of the said delivering apron, when used as set forth with the main delivery apron or carrier, and the apparatus for reducing the paste and sugaring it on both sides, being to enable the sheet of paste to be seen on both of its sides before passing to the cutters.

I also claim the combination and arrangement of the delivery apron, G, the cutter board, H, the series of cutters, L, and the lozenge-discharging apron, N, the same not only enabling the sheet of paste to drop vertically and fall by its own weight preparatory to and after being cut, but causing the cutters to discharge the lozenges on a discharging apron or boards placed thereon, in manner as set forth.

I also claim the arrangement and combination of the surface-charging apron, I, with the cutter board, H, the delivery apron, G, the series of cutters, L, and the lozenge-discharging apron, N, arranged as specified.

I also claim the arrangement and combination of the comb plate, O, with the cutters, L, and their stamping board, H, or device for supporting the paste while it is being stamped.

39,197.—Circular Loom.—William Darker (assignor to J. B. Thompson), Philadelphia, Pa. :

I claim, first, The employment for acting upon the warp threads in a circular loom to produce an open shed for the introduction of the weft, of a series of leaders, D D, applied and operating substantially as herein specified.

Second, The employment, for passing the weft thread or threads through the open sheds of the warp in a circular loom, of a carrier, G, supported by a surrounding series of grooved pulleys, G G, which serve both to sustain it in its proper position and to give it rotary motion, substantially as and for the purpose herein specified.

Third, The cam, K, attached to the carrier, C, and operating through the agency of levers, L L, and wires, k k, or their equivalents, to produce the operation of the leaders, D D, substantially as and for the purpose herein specified.

[The principal features of this invention consist of certain novel means of opening the sheds of the circularly-arranged warp and in a novel device for carrying the filling through the open sheds]

39,198.—Breech-loading Fire-arm.—Jarvis Davis (assignor to Patrick Smith), Buffalo, N. Y. :

I claim the hooked bar, G, operated by the hammer, substantially as described, in combination with the block, G′, and hinged abutment, C, so that the hooked bar is thrown out of engagement with the cartridge when the hinged abutment is closed, substantially as set forth.

39,199.—Composition for dyeing the Covers of Railroad Seats, &c.—A. A. Grandelle (assignor to Thomas Brown), New York City:

I claim the composition of matter herein described for dyeing cushions and other articles, prepared and employed in the manner herein set forth.

[The principal object of this invention is to re-dye the cushions of railroad car seats with aniline colors without ripping them open and taking them to pieces.]

39,200.—Washing Machine.—B. S. Hill, Wattsburg, Pa., assignor to himself and Sterling Doolittle, Amity township, Erie Co., Pa. :

I claim the combination of the pounders, F B and B, and the inclined plane, G, substantially as set forth for the purpose specified.

39,201.—Roller for Wringing Machines.—H. W. Holly and A. F. Smith (assignors to A. F. Smith), Norwich, Conn. :

We claim, first, In the construction of soft and elastic rolls the employment of soft pieces, C C, hard pieces, B B, and the splined or equivalent shaft, A A′, arranged to operate together in the manner and for the purpose herein set forth.

Second, We claim, in connection with the yielding pieces or disks, C C, and hard pieces, B, arranged as specified, the employment of the projections, b b′, or either of them, arranged substantially as and for the purpose herein set forth.

Third, We claim the combination of the tightly fitted covering, G, with disks of soft material, C, and suitable means of confining the same, substantially as and for the purpose set forth.

Fourth, We claim the spurred plates or wheels at one or both ends of the roll, as represented by E e, arranged as represented relatively to the open plate, D, covering, G, and pin, H, or their respective equivalents, for the purpose herein set forth.

39,202.—Composition for Paint.—Josiah Miller, Moore Township, Pa.: assignor to Harrison Trumber, Hokendauqua, Pa., and W. C. Kleppinger, Alba township, Pa. :

I claim a paint mixture prepared substantially as hereinbefore set forth.

39,203.—Door Lock and Latch.—W. T. Munger (assignor to Thomas Kennedy), Branford, Conn. :

I claim the combination of the horseshoe, E, latch bolt, D, and cam, H, or its equivalent, substantially as herein specified.

Second, I claim the combination described of the latch bolt, D, and cam, H, for the purpose substantially as herein specified.

39,204.—Composition in preparing Paints.—Eliza M. Seabury, Brooklyn, N. Y., administratrix of Jacob Seabury, deceased :

I claim the pigments herein described composed of a combination of the ingredients specified as and for the purposes set forth.

39,205.—Churn.—R. W. Whitney (assignor to himself and A. G. Neally), South Berwick, Maine :

I claim the improved churn as not only constructed with the lever, C, and the curved arm, D, arranged relatively to the reservoir, A, and the dasher, E, as specified, but as having the strut, F, combined and arranged with the curved arm, D, and the dasher, E, so as to operate substantially as described.

RE-ISSUES.

1,509.—Sheet-metal Spoon.—Florian Grosjean, New York City. Patented Jan. 28, 1862 :

I claim stamping or swaging spoons, of single pieces of sheet-metal with a middle corrugation or raised ridge, extending along the narrow or weaker part of the handle, and prolonged into the bowl of the spoon, so as to give full strength to the junction of the bowl and handle, either leaving the handle flat on both sides, or with a bead around the middle corrugation, substantially as and for the purposes herein specified.

1,510.—Artificial Leg.—Douglas Bly, Rochester, N. Y., assignee of R. H. Nicholas and Douglas Bly. Patented July 28, 1857 :

I claim a universal joint in connection with two parts, A B, of an artificial leg, substantially as and for the purpose herein set forth.

Also, two tendons, t t, and their springs, s s, or their equivalents, in combination with two parts, A B, of an artificial leg, for the purpose of holding the said parts properly together, and keeping the articulating surfaces of the joint in constant co-aptation, substantially as herein specified.

DESIGNS.

1,796 to 1,799.—Blind Binding (3 cases).—H. W. Hensel, Philadelphia, Pa.

1,800 to 1,802.—Plate of a Cook's Stove (4 cases).—S. B. Ransom, Albany, N. Y.

1,803.—Plate of a Stove.—Garrettson Smith & Henry Brown, Philadelphia, Pa., assignors to Marsh & Sisler, Lawrenceville, Pa.

EXTENSION.

Regulator for Self-acting Mules.—E. C. Sawyer, Salem, Mass. Patented July 3, 1849 :

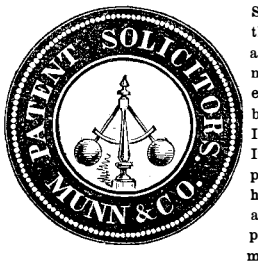
I claim the regulator constructed and made to operate substantially as above described, the same consisting of the combination of the weighted centrifugal lever, e, the lever pawl or click, h, the ratchet wheel, k, its cam, l, and the lever, n, applied together and to the main driving shaft, A, and the slide, U, of the hoist cam, essentially as above specified.

And as auxiliary to the above, I claim the second centrifugal weighted lever, r′, and the ring, t, and retractive spring in combination therewith, the same being for the purpose above explained.

IMPORTANT TO INVENTORS.

PATENTS FOR SEVENTEEN YEARS.

MESSRS. MUNN & CO., PROPRIETORS OF THE SCIENTIFIC AMERICAN, continue to solicit patents in the United States and all foreign countries, on the most reasonable terms. They also attend to various other departments of business pertaining to patents, such as Extensions, Appeals before the United States Court, Interferences, Opinions relative to Infringements, &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.



THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent free of charge. Address MUNN & CO., No. 37 Park Row, New York.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank-bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

The revised Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

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The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the Government fee required on filing an application for a patent is *reduced* from $30 to $15. Other changes in the fees are also made as follows :—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (but in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

During the last seventeen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the inventors throughout the country, we would state that we have acted as agents for at least TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees at home and abroad. Thousands of inventors for whom we have taken out patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the inventors whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in our extensive offices, and we are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

REJECTED APPLICATIONS.

We are prepared to undertake the investigation and prosecution of rejected cases on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with us on the subject, giving a brief story of the case, inclosing the official letters, &c.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat, under the new law, is $10. A pamphlet of advice regarding applications for patents and caveats, printed in English and German, is furnished gratis on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

FOREIGN PATENTS.

We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through the Scientific American Patent Agency, No. 37 Park Row, New York.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through our Agency, the requirements of different Government Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park Row, New York, or any of our branch offices.

ASSIGNMENTS OF PATENTS.

Assignments of patents, and agreements between patentees and manufacturers are carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

It would require many columns to detail all the ways in which inventors or patentees may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of patentees will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park Row, New York.

Binding the "Scientific American."

It is important that all works of reference should be well bound. The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is preserved by a large class of its patrons, lawyers and others, for reference. Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we commenced on the expiration of Volume VII. to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style is 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, No. 37 Park Row, New York.

Back Numbers and Volumes of the Scientific American.

VOLUMES I., II., III., IV., V., VII. AND VIII. (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $2 25 per volume, by mail, $3—which includes postage. Every mechanic, inventor or artizan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. VOL. VI. is out, of print and cannot be supplied.

TO OUR READERS.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of our reception of their funds.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that are required to accompany the petition, specification and oath, except the Gover nme nt fee.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,
No. 37 Park-row, New York.

Rules and Queries

J. H. P., of N. Y.—You state your case so that it is difficult to decide. You say, "the steam pipe enters the boiler just below the crown sheet, so there is plenty of steam space." Do you not mean the *shell* of the boiler? The crown sheet is the top of the fire-box. The trouble you refer to is caused by the water following the steam passing through the main pipe. The water in the boiler is raised by the steam and carried over with it, and of course, shows itself at the upper gage. When the steam is shut off, the water which is left subsides, and is, consequently, far below the water-line. You blow the steam off too fast; let it go more slowly and you will, probably, have no trouble. The feed pump is not large enough to supply the demand; steam condenses in the main pipe because it is cold, and water passes over with the steam, causing a double consumption of water and fuel.

S. Q., of Canada West.—Boilers are liable to foam when they are new, when their steam space is too confined, and when their water is foul. An injector is a most efficient substitute for a feed-pump. Messrs. Sellers, of Philadelphia, manufacture Giffard's injectors.

C. M. H., of Wis.—We have never seen experiments made with the turbine wheel to which you refer, and cannot tell how much water it discharges when running free; but in all likelihood it discharges like some other wheels, more than when driving a full train of machinery and running at a lower velocity.

L. K. W., of Iowa.—Governors for marine engines have been successfully introduced. If you have anything valuable in that line you had better send us a sketch and description of it for examination. We shall send you, by mail, a copy of our pamphlet of advice about patent matters.

E. B., of Mo.—If the parties to whom you refer manufactured your invention within the limits of the United States, you can recover damages from them, as it is an infringement to make a patented invention without the patentees consent.

H. L. S., of Ill.—It would have been very easy for you to try the experiment, whether two magnets placed twelve inches apart "will move together." They will not. A magnet will not draw the iron ball to it from a distance of twelve inches.

J. C. J., of N. Y.—Feathers may be dyed a scarlet color by boiling them in a clean tin vessel with some water, ground cochineal, a little cream-of-tartar, and a few drops of the muriate of tin. Put these ingredients into the vessel, and, when boiling, place the feathers therein, and boil for fifteen minutes; then take them out and wash them in cold water. This color is permanent, and one ounce of cochineal will dye one pound of feathers, which should be washed in soap before being dyed. Feathers may also be dyed yellow by boiling them in a strong decoction of quercitron and a few drops of the muriate of tin. These colors are suitable for the feathers of hooks intended for fishing.

R. A. R., of L. I.—The turret plates of the *Monitors* were not "bent near the deck" in the engagement at Charleston (as we have been informed), so as to prevent the turrets from revolving.

W. M., of N. Y.—A diamond does not neutralize the magnetism of a magnet. Whoever told you to the contrary is mistaken. If you place a piece of steel in the inside of a glass tube, and apply a magnet on the outside, the steel will be attracted.

S. B. C., of Pa.—When two cisterns are placed at different levels below a spring or fountain head, and the water is conveyed to them by a branch pipe, the overflow will be by the waste pipe of the lower cistern. Water always seeks the lowest level.

F. W. E., of N. Y.—There is no reliable way of ascertaining the quantity of air that passes through your register into the chimney, without first finding out its velocity. This could be done with an aerometer, for measuring the force of air currents. By multiplying the velocity of the air, in feet, per second, into the area of the register in square feet, the quantity which passes through in a second will be given in cubic feet.

S. W., of N. J.—The mode which you propose for protecting the steam pipe of your engine, by enclosing it in a wooden box filled with saw-dust, to prevent the condensation of steam, will answer very well. Plaster-of-Paris, however, is superior to the saw-dust as a safe non-conductor; so is common plaster mortar that is mixed with hair.

H. M., of Canada West.—The powder ignited in a gun exerts the same amount of pressure upon the breech that it does upon the bullet. You should make an experiment to test the question of securing the harness traces of the horse in drawing a load so as to exercise his power most advantageously.

J. C. A., of N. Y.—Sixteen years ago we saw a small boat propelled by the reaction of water on the East river, in this city. The water was forced through a tube passing out at the stern of the boat. The principle is old, having been first suggested and tried by James Rumsey about 1786. It is an inferior system to the paddle and screw, and we advise you to spend no money in making experiments with it.

J. McD., of Maine.—Your ideas respecting the construction of screw steamers with iron frames, an inside skin of iron plate, and an outside planking of wood are good. Such vessels could be sheathed with copper and thus be free from the fouling so common to iron-plated vessels.

J. R., of Vt.—Charcoal and clean sand are about the best substances you can use for filter beds. The charcoal should be fine, but not reduced to powder, and the beds about one foot in depth.

H. K., of N. Y.—Lead pipes tinned inside for conveying water are of old date, and have been used to some extent in this city. If the tin becomes detached, in small spots, from the lead, a galvanic action ensues, and the lead is decomposed more rapidly than if it had not been coated with the tin. Such pipes, therefore, have not been approved.

W. McT., of Pa.—The magnetic oxide of iron has been used for purifying water. When broken into small pieces and arranged in a layer of a few inches in depth, muddy water was rendered clear by being passed through it. You can easily make an experiment with it and satisfy yourself.

M. A. W., of L. I.—A blower would greatly increase the draft of your chimney. As you find it difficult to apply it to the several furnaces of your boilers, it may answer every purpose to apply it direct to the chimney, if not, branch pipes must be connected with the furnaces. The exhaust steam from the cylinder of your engine would also increase the draft of your boilers.

J. B., of Ill.—By case-hardening the slots in the shanks of your reaper blades they will wear three times longer.

H. W. L., of Wis.—In manufacturing shot for fowling pieces a small quantity of arsenic is mixed with the lead, otherwise it will not drop with facility through the sieves.

T. B., of Ohio.—The velocity of a falling body is ascertained by multiplying the square root of the hight by 8, which is the co-efficient for the action of gravity in falling one foot. Thus a body having fallen 16 feet has a velocity of 32 feet—the square root of 16 being 4, which, multiplied by 8, gives 32. This rule will enable you to calculate the velocity of water at the foot of falls of any hight.

W. W. V., of N. J.—The sulphate of lead is formed with solutions of alum and the acetate of lead. Dissolve one pound of alum in two gallons of hot water, and one pound of the acetate of lead in an equal quantity of water, and mix them together, when double decomposition will be effected, and the acetate of alum and sulphate of lead will be formed. This solution is used for rendering cloth water-proof. Immerse the cloth in the clear liquor after the sediment has settled; take it out and dry it in a warm room, and it will shed water like the back of a duck.

A. J. H., of N. Y.—Your communication upon "The Science of Projectiles" may be very excellent, but the penmanship is so wretched that we could not get through with more than five lines of it.

J. T. F., of Mass.—Locomotive boilers could be made just as efficient and strong without steam domes as with them.

H. O. W., of N. Y.—The most permanent red color on wool is obtained from madder. Aniline and cochineal reds are more beautiful, but they do not stand washing with soap and exposure to sunlight like madder red.

J. T. of Pa.—The prussiate of potash answers well for case-hardening small articles; but the old method of operation—with bone-dust, pieces of hoofs, and leather—is superior for large articles.

RATES OF ADVERTISING.

Twenty-five Cents per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

VULCANIZED RUBBER—
Adapted to mechanical purposes—MACHINE BELTING, STEAM PACKING, VALVES, HOSE, EMERY, VULCANITE WHEELS, &c. &c. Directions, prices, &c., can be obtained on application to the NEW YORK BELTING AND PACKING COMPANY,
Nos. 37 and 38 Park Row, New York.
JOHN H. CHEEVER, Treasurer. 4tf

FOR SALE—THREE NEW STATIONARY ENGINES—Cylinder 7 inches bore, 14 inches stroke; fly-wheel 4 feet diameter, 12 inches face; complete, with cocks, pump, &c. Boiler, double return flue, 36 inches diameter, 15 feet long; fitted with valves, cocks and pipes to connect with engine. Also 25 feet iron chimney, and all fixtures required to put the engine in operation. Price $800 each, securely packed. ALBERTSON & DOUGLASS MACHINE CO.,
4 2* New London, Conn.

GAS FROM KEROSENE TAR AND HARD WOOD for factories, &c.; 400 feet from one gallon of tar. The charcoal buys the wood. Address H. Q. HAWLEY, Albany, N. Y. 1*

STEAM AND WATER GAGES, GLASS TUBES, PATENT gage cocks, whistles and engine counters, for sale. Also indicators for ascertaining the working horse-power of steam engines, heatgages and signal gongs for steamboats. E. BROWN, 311 Walnut street, Philadelphia, Pa. 1*

THE UNRIVALLED DOUGLASS ARTIFICIAL LIMBS are adapted and applied to all forms of amputations. Recommended by the leading surgeons; liberally patronized by the U. S. Army and Navy officers. Manufactured by D. D. Forrest Douglass, Burt's Block, Springfield, Mass. 4 2*

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A VALUABLE WORK FOR INVENTORS, PATENTEES AND MANUFACTURERS.

The publishers of the SCIENTIFIC AMERICAN have just prepared, with much care, a pamphlet of information about Patents and the Patent Laws, which ought to be in the hands of every inventor and patentee, and also of manufacturers who use patented inventions. The character of this useful work will be better understood after reading the following synopsis of its contents:—

The complete Patent Law Amendment Act of 1861—Practical Instructions to Inventors, how to obtain Letters Patent, also about Models—Designs—Caveats—Trade-marks—Assignments—Revenue Tax—Extensions—Interferences—Infringements—Appeals—Re-issues of Defective Patents—Validity of Patents—Abandonment of Inventions—Best Mode of Introducing them—Importance of the Specification—Who are entitled to Patents—What will prevent the Granting of a Patent—Patents in Canada and European Patents—Schedule of Patent Fees; also a variety of miscellaneous items on patent law questions.

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WAR DEPARTMENT.

PROVOST MARSHAL GENERAL'S OFFICE,
WASHINGTON, July 10, 1863.

The following extracts from laws of the United States, now in force, are published for the information and guidance of all concerned:—

Section 12, of the Enrolment Act, after directing how the draft shall be conducted, says: "And the person so drawn shall be notified of the same within ten days thereafter, by a written or printed notice, to be served personally, or by leaving a copy at the last place of residence, requiring him to appear at a designated place of rendezvous, to report for duty."

Section 13, of the Enrolment Act, contains the following: "And any person failing to report after due service of notice as herein prescribed, without furnishing a substitute or paying the required sum therefor, shall be deemed a DESERTER and shall be arrested by the Provost Marshal and sent to the nearest military post for trial by Court-martial, unless, upon proper showing that he is not liable to do military duty, the Board of Enrolment shall relieve him from the draft."

The 20th Article of War contains the following: "All officers and soldiers . . . convicted of having deserted, shall *suffer* DEATH, or such other punishment as by sentence of court-martial shall be inflicted."

JAMES B. FRY,
1 Provost Marshal General.

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A MESSIEURS LES INVENTEURS.—AVIS IMPORTant. Les inventeurs non familiers avec la langue Anglaise, et qui préféreraient nous communiquer leurs inventions en Français, peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront reçues en confidence. MUNN & CO.,
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TO MANUFACTURERS AND MACHINE BUILDERS.—The undersigned being engaged in the purchase and sale of machinery, such as steam engines, mill and factory machinery, lathes, tools, and all kinds of manufactured machines and implements, and assisting commission merchants and others in their purchases, solicits from manufacturers their circulars, price lists, terms, &c., also any illustrations of their machinery or works they may have. Parties introducing new inventions or improvements will find it to their interest to communicate with him, giving such information in regard to their improvements as they deem necessary, which will receive the attention due to their merits. J. E. STEVENSON, Machinery Broker, 200 Broadway, New York. References:—The Novelty Iron Works, New York; Franklin Townsend, Albany, N.Y.; Lowell Machine Shop, Lowell, Mass.; Hunsworth, Eakins & Naylor, People's Works, Philadelphia, Pa. 1 5*

FIBER-CLEANING MACHINE.—THIS VALUABLE machine, the invention of Eduardo J. y Patrullo, and illustrated on page 368, last volume, SCIENTIFIC AMERICAN, is now on exhibition, where the public are invited to examine it, at the establishment of TODD & RAFFERTY, No. 13 Dey street, New York. 2 13

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The exhibition will be general, embracing MANUFACTURES of all kinds, NEW INVENTIONS, IMPROVEMENTS IN AGRICULTURAL IMPLEMENTS and the MECHANIC ARTS generally, excepting only machinery propelled by steam-power. Premiums, consisting of Gold, Silver, and Bronze Medals, and Diplomas, will be awarded on the decision of competent and impartial judges. Articles for competition for the premiums will be received commencing August 28, 1863, and the Fair will be opened to the public on

WEDNESDAY, SEPTEMBER 2.

Circulars giving full particulars can be had at the rooms of the Institute in the Cooper Union Building.

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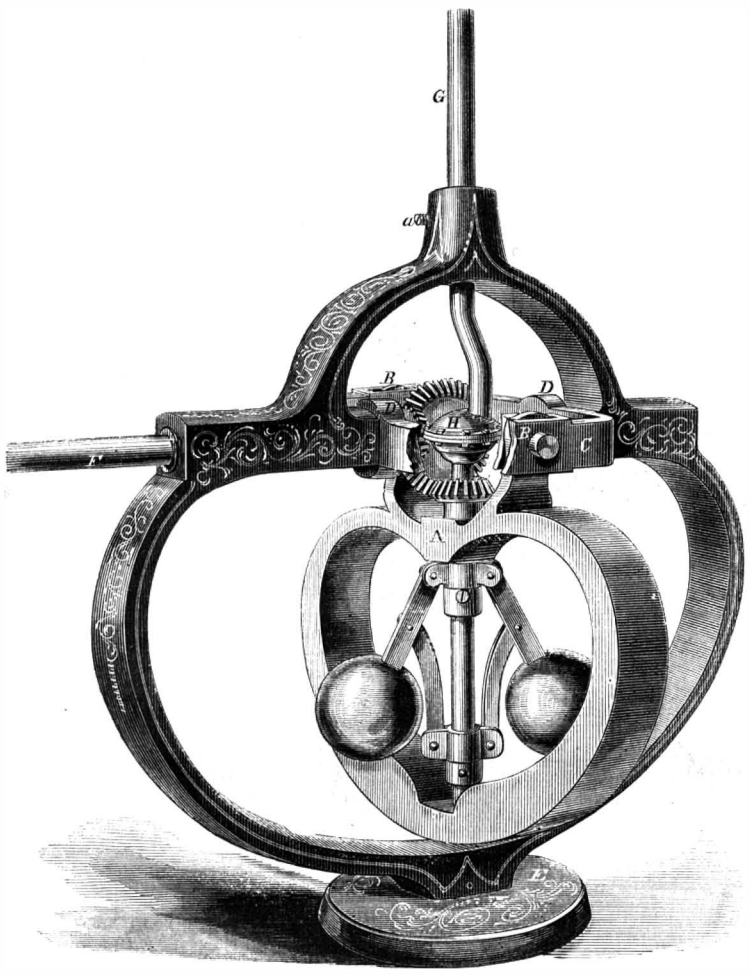

BEHREN'S PATENT MARINE GOVERNOR.

frame is hung on centers at B B, in the secondary frame, C; this secondary frame is also hung on centers at D, thus giving a universal joint or movement to the governor proper, working in the frame, A, and maintaining it in a vertical position at all times, so that the balls are free to work, and the collar to slide up and down on the shaft without binding, no matter at what angle the deck or keel of the ship may be. The pedestal, F, is of course fastened firmly to the engine frame in any desired position, and motion is communicated to the balls by a pulley on the shaft, F. The throttle valve connects to the stem, G, which has a ball-and-socket joint, H, so that it communicates the variations of the governor to the throttle equally well in all directions. The small screw, *a*, works in a slot, and prevents the stem from turning. This invention was patented on March 24, 1863, by Henry J. Behrens, model and pattern maker, of New York city; further information can be had by addressing him at 170 Chatham street, New York.

DISINFECTING AGENTS.

During warm weather decaying organic substances near dwellings emit offensive and unhealthy gases. In situations where the putrid substances cannot be removed, disinfecting agents should be employed for neutralizing their effects. The common gas which is emitted from sinks and sewers is sulphureted hydrogen (H S). It has a peculiarly nauseous fetid odor, resembling that of rotten eggs, and it is so diffusable that a single cubic inch of it escaping into a large room will render the atmosphere offensive. It is inflammable, burning with a pale blue flame, and when respired it is dangerous. Even when diluted with a considerable amount of atmospheric air, it produces nausea, headache, faintness and loss of appetite, when inhaled for a moderate length of time. Chlorine is a powerful disinfectant of this gas, because the hydrogen of it combines with the chlorine, and sulphur is deposited. The chloride of lime is, therefore, a most convenient substance to use as a disinfectant. It may be sprinkled in the solid state among decaying substances, or it may be placed where the chlorine will evaporate into the atmosphere and combine with the fetid gas, or it may be mixed with water and sprinkled over floors or poured into sinks. Chloride of zinc also decomposes it, and this has been used extensively as a disinfecting fluid. This gas is rapidly absorbed by charcoal, the hydrogen being oxidized and sulphur deposited. If a weak solution of sulphureted hydrogen is shaken with powdered charcoal, the smell of the gas rapidly disappears. Owing to this property of charcoal, respirators containing charcoal have been recommended for persons whose occupations compel them to breathe the exhalations of sewers.

One of the most efficient substances for the removal of sulphureted hydrogen, either in the state of gas in the atmosphere, or in a solvent form in sewers and sinks, is the hydrated peroxide of iron. This substance is now largely employed in some places for the separation of sulphuretted hydrogen in coal gas. The peroxide of iron may be prepared by roasting the sulphate of iron (copperas) in a stoneware bottle exposed to a full red heat; sulphuric acid is driven off through the neck of the bottle, leaving the peroxide in the state of a red powder. Copperas itself is a good disinfectant and is very easy of application by any person. One pound of copperas dissolved in a pailful of boiling water and poured into a fetid sink will banish all the foul odor in ten minutes. Fresh slaked lime is also a disinfectant, but copperas is superior to it, especially where ammonia is present, as in a sink. The odor of sulphureted hydrogen reveals its presence when it only forms 1-200,000 part of the atmosphere. For disinfecting sewers and other such receptacles of decaying organic matter upon a large scale, we recommend the hydrated peroxide of iron, but for families to use in sinks copperas is about the best substance that can be employed.

A CORRESPONDENT of the Boston *Cultivator* considers it an important item in the cultivation of potatoes to pick off the blossoms as soon as they appear, for the reason, as he says, that it hurts a potato as much to go to seed as it does a radish or any other root crop.

BLOCKADE RUNNING.—The Charleston *Mercury* says there were 23,000 bales of cotton exported last year from that city, and 9,800 the first quarter of this year.

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No person engaged in any of the mechanical pursuits should think of doing without the SCIENTIFIC AMERICAN. It costs but six cents per week; every number contains from six to ten engravings of new machines and inventions which cannot be found in any other publication. It is an established rule of the publishers to insert none but *original* engravings, and those of the first class in the art, drawn and engraved by experienced artists, under their own supervision, expressly for this paper.

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To the Inventor!

The SCIENTIFIC AMERICAN is indispensable to every inventor as it not only contains illustrated descriptions of nearly all the best inventions as they come, but each number contains an Official List the Claims of all the Patents issued from the United States Patent Office during the week previous; thus giving a correct history of the progress of inventions in this country. We are also receiving, every week, the best scientific journals of Great Britain, France and Germany; thus placing in our possession all that is transpiring in mechanical science and art in those old countries. From those journals we shall continue to transfer to our columns copious extracts of whatever we may deem of interest to our readers.

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FROM THE STEAM PRESS OF JOHN A GRAY

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